STUDENT PERFORMANCE AND DIRECT INSTRUCTION EXPENDITURES IN FLORIDA PUBLIC SCHOOLS

BY
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Abstract of Dissertation Presented to the Graduate School of the University of Florida in Partial Fulfillment of the Requirements for the Degree of Doctor of Education

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The purpose of the study was to examine factors affecting test performance of fourth and eighth grade students in Florida public schools during 1994-1995. Districts administering the Comprehensive Test of Basic Skills, Form A, were included. The impact of district size, per pupil direct instruction expenditures, and per pupil instructional materials allocations on test scores was examined.

The research consisted of two phases. In Phase I, data were analyzed to determine if relationships existed between test scores, per pupil direct instruction expenditures, per pupil instructional materials allocations and district size. Computerized multiple regression analyses were performed. At both the 4th grade and 8th grade levels, a positive correlation was found between district size and reading and mathematics scores. Grade 4 testing results showed a

negative correlation between expenditures and CTBS scores; spending more money did not yield higher test scores. There was a positive correlation between expenditures and test scores in grade 8; higher direct instruction expenditures produced higher CTBS scores. At the 4th grade level, increasing allocations did not produce higher CTBS test scores. However, increased allocations for 8th grade students yielded higher scores. While correlations were found to exist between the dependent variable and the independent variables, no significance was found at the .05 rejection level.

In Phase II, a qualitative survey aligned with the independent variables was developed to augment Phase I. Ten districts included in Phase I were selected to rank factors influencing student performance. Pupil/teacher ratio was ranked as having the most influence on student performance. Experience level of the teacher ranked second. The least influential factor was teacher's aide in the classroom. Other factors included per pupil direct instruction expenditures, socioeconomic/family, and teacher's level of education. The low ranking of teacher's aide in the classroom suggests this factor may increase instructional costs without increasing student performance at the 4th grade level, as found by the data analyses in Phase I. This study suggests the need for further research of factors

increasing student performance without increasing direct instruction costs.

CHAPTER I
INTRODUCTION

As the year 2000 approaches, leaders in American education and politics at national, state and local levels ponder how the widespread discontent expressed throughout the 1990s can be addressed (Bloomfield, 1993; Blueprint, 1994; Deller & Walzer, 1993; Mehrens, 1989). Leaders of industry, local school board officials, administrators and teachers loudly voice they are overburdened (County, 1993; Muth, 1983).

There is a widespread perception that achievement levels of American students are declining while the costs of education are rising (Hanushek, 1989; Stedman, 1995; Wainer, 1993). No longer can the education of students be considered solely in terms of local needs (Annual, 1993; How is, 1993; How North Carolina, 1993; Facts, 1992). With the technological challenges of the next century looming, American students must be prepared to compete globally (Hough, 1993; Master, 1992).

Parents object to further increasing taxes to fund what is perceived as an inadequate public educational system in this country (Deller & Walzer, 1993; Wilson, 1994). Leaders of industry report they are overburdened by an

emerging work force which is ill-prepared to meet the challenges of the next century (Elam, 1995; Elam & Rose, 1995; Elam, Rose, & Gallup, 1992; Elam et al., 1993; Elam et al., 1994; Elam et al., 1995). Local school board members and school administrators lament dwindling financial support, which they perceive as being woefully inadequate to meet increasing demands made by other stakeholders. Among these stakeholders are teachers, support staff, parents, the business community, and the public in general (Cardenas, 1992; The cost, 1991; Wilson, 1994).

Public education in the United States is not addressed specifically in the United States Constitution and the responsibility, therefore, evolves to the states (Dayton, 1993). Not all state constitutions address public education (Kimbrough & Nunnery, 1983). What has evolved in this nation into a perception that a free public education is a basic and universal right is, in fact, not so constitutionally (Turner, 1959).

The issues raised most frequently in legal challenges relate to the methods by which public education is funded and whether such funding is adequate and equitable, as well as equal or fair (Ascher, 1993; Thompson, Wood & Honeyman, 1994). Historically, wealthy school districts expend more dollars on education and their students tend to score higher on standardized tests than students from districts which expend less (Wainer, 1993). Recommendations

by former President George Bush and the conference of the nation's state governors for Goals 2000 in education have prompted states to begin examining closely the performance of their students when compared to other states across the nation (Patrick, 1993).

A review of related literature finds some consistently reported variables in the relationship of public school expenditures and student outcomes (Annual, 1993; Blosser, 1985; Drake, 1994). These variables, including socio-economic status of family households, family structure, and level of education of family members, are emotionally inflammatory and publicly divisive (Factors, 1993). As a result, student achievement expressed in terms of such alleged relationships generally is not accepted by those persons calling for adequate funding of public education in this country (Hobby & Walker, 1991). Such persons argue that raising the level of funding for poorer school districts will enhance the level of achievement test scores of such districts, enabling their students to perform at a level on par with wealthier school districts (Sharp, W., 1993; Wainer, 1993).

A common public perception is that the highest test scores indicate the best schools in a district and parents want the best for their children. Therefore, they want their children enrolled in the successful schools (Matter, 1989). The prevailing underlying cause of disparity in

level of educational achievement is the great variability in educational funding methods among school districts within a particular state, as well as wide disparity in educational funding among states across the nation (Hoffman, 1993; Picone, 1993; Thompson et al., 1994; Wainer, 1993).

Statement of the Problem

It appears from the literature that there is a need to examine further the infusion of direct instruction funds into the public school setting to determine relationships which may exist between direct instruction expenditures and student performance, as reflected in norm-referenced, standardized achievement test scores. There also appears to be a need to examine instructional materials allocations and school district size in relation to student achievement outcomes, in order to identify areas where the infusion of additional dollars may have a greater impact on student performance.

Since there is a general lack of agreement regarding level of educational funding per student and a possible relationship with student performance as expressed in achievement test scores, clarification is needed so that various stakeholders--especially educational leaders, school board members, and legislative decision makers--can gain a clearer understanding of the impact of educational expenditures on student outcomes.

Student achievement test scores are the recognized yardsticks utilized to express such outcomes. Bagin (1989) reported that standardized tests, by their very design, give a common measure of student performance for purposes of comparing an individual student's performance to the norm or average student taking the same test. Such norm-referenced, standardized achievement tests have been administered over an extended period of time to large numbers of students throughout the nation, yielding a standard measure which can be utilized to evaluate schools and curriculum programs. In addition, such tests provide information regarding the skills and abilities of individual students at a particular point in time (Rasinski, 1993).

While a global implication is noted in the literature regarding educational expenditures and student outcomes, an investigation into per pupil instructional materials allocations, per pupil direct instruction expenditures patterns and size of school districts in Florida can serve to contribute to the understanding of educational funding and expenditures as related to student performance in general. According to Renchler (1992), "general school expenditures are not related to improved student academic performance. However, the way in which educational funding is used affects student achievement" (p. 2).

As recently as school year 1992-1993, public elementary and secondary schools across the nation expended a total of

$135 billion on instruction, which is approximately $3,155 per student (Statistical, 1995). When various funding sources (state, local and federal) were analyzed, there was a continuing reported disparity among funding expenditures between and within the various states (Sharp, J., 1992).

In Florida, the Florida Education Finance Program (1994) provides for a minimum per pupil allocation to the state's 67 public school districts. However, districts are required to provide an additional minimum level of local effort monies through local property tax levies. Thus, an immediate disparity exists between districts hampered by an inadequate property tax base (they are less able to locally raise adequate funds via the ad valorem tax to support public education) and wealthier districts which have greater local tax base resources.

Purpose of the Study

The purpose of this study was to determine if a relationship exists between per pupil instructional materials allocations, per pupil expenditures for direct instruction, school district size and student performance of fourth grade and eighth grade students in Florida's public schools. In addition, a qualitative survey was developed to elicit information from school districts to augment data analyses which were performed. Reported median test scores [median national percentile rank (MNPR)] for grades 4 and 8 in

reading and mathematics for the school year 1994-1995 were utilized as the student performance measure. This study provides additional data regarding the infusion of education dollars into direct instruction and student outcomes in the state of Florida.

Research Question

The research question utilized as the focus of this study was as follows:

> Is there a relationship between per pupil direct instruction expenditures, per pupil instructional materials allocations and student performance on the Comprehensive Test of Basic Skills, Form A (CTB A) in reading and mathematics for Florida public school fourth grade and eighth grade students when size of school district is considered?

Significance of the Study

This study was significant because of the increased emphasis currently being placed on issues associated with accountability in Florida's Blueprint 2000 (1994) and the financing of public education in this country. Stakeholders (such as the general citizenry, school board members, professional educators, legislators, and the judicial system) are scrutinizing the methods whereby revenues are generated and expended in the support of public education in this country (Wilson, 1994). The pervasive questions seem to relate to provision for equal education, and whether or

not equal spending will result in equal achievement (King & Ramirez, 1994; Kozol, 1992; Performance, 1992).

This study investigated spending patterns and student performance in a state ranked 27th nationally with regard to public education per pupil expenditures (Statistical, 1995). Previous studies have examined relationships such as input factors and output factors relating to student performance (Factors, 1993; Wainer, 1993). Some studies have investigated per pupil costs to determine correlations between classroom teacher salaries, family demographics and socioeconomic factors (Hanushek, 1989). A review of related research studies revealed apparent contradictory findings comparing expenditures with student performance. Some studies reported a high correlation between cost and educational quality (Wainer, 1993). Other studies, such as that by Wise (1968), concluded little or no significant relationship exists.

Delimitations and Limitations

Due to the nature of this study, some delimitations and limitations were inherent. There were four delimitations and three limitations. These are discussed in subsequent paragraphs.

Delimitations

1. The target population was limited to the public school districts in Florida, grades 4 and 8.

2. The target was all students enrolled in grades 4 and 8 taking the Comprehensive Test of Basic Skills, Form A, in the public school districts of Florida, as reported for the school year 1994-1995.

3. The demographic characteristics of a school district were limited to district size (total student enrollment), and number of fourth grade and eighth grade students taking the norm-referenced, standardized achievement test used in this study (Comprehensive Test of Basic Skills, Form A).

4. The data supplied by the Florida Department of Education for school district instructional materials allocations were total figures for K-12.

Limitations

1. This study did not control for family factors, class size, curriculum, time on task, student placement or community resources.

2. This study was limited by financial and test score data provided by the Florida Department of Education for the year included in this study.

3. The financial data supplied by the Florida Department of Education reflected average per pupil direct instruction expenditures across all grade levels, K-12. Any differences by grade levels or weightings were collapsed into the total average per pupil direct instruction expenditures reflected in this study.

Definitions

For purposes of this study, the following definitions were utilized:

Direct instruction expenditures refer to current operating costs specifically related to classroom instruction, such as textbooks and library/media materials, other classroom instructional supplies, teacher and teacher aide salaries, and classroom instructional equipment. Not included are expenditures for school bus transportation, facilities, debt service, capital outlay, administrative salaries and administrative support functions.

Instructional materials allocation refers to State of Florida categorical funding for classroom instructional materials and library/media reference materials.

The terms student achievement, student outcome, and student performance all refer to scores obtained on norm-referenced, standardized tests. For purposes of this study, these terms are all equivalent in their usage throughout this study.

Organization of the Study

Chapter I provided an introduction to the problem, along with a statement of the problem, the purpose of the study, a list of the research questions investigated in the study, significance of the study, limitations of the study, definitions, and organization of the study.

Chapter II contains a review of literature and research related to (a) instructional materials and test scores, (b) funding and achievement tests, (c) size of school districts, and the possible relationships which may exist among the factors of per pupil direct instruction expenditures, per pupil instructional materials allocations, size of school district, and student performance measures. A summary of the literature and research review, as well as implications for this study are at the end of Chapter II.

Chapter III presents the methodology or research design of the two-part study. Phase I of the study was statistical in nature. Phase II was qualitative in its approach. Included are the procedures and methods used in the study, the method of collection of the data analyzed, a description of the target population, the statistical analysis methods used, and procedures used in analysis of the data. The purpose of Phase II was to augment data obtained in Phase I.

The results of the study, including presentation of the data and analyses, are presented in Chapter IV. A summary of the findings is included at the end of the chapter.

Chapter V contains the discussion of the results of the study, including a summary of the conclusions. Implications of the study and recommendations for further study are found at the end of the chapter.

CHAPTER II
REVIEW OF THE LITERATURE

Introduction

Under goal 4 of the Florida Blueprint 2000: A System of School Improvement and Accountability (1994), the need is stressed to provide a learning environment conducive to teaching and learning using appropriate educational materials. Talmage and Eash (1979) have reported students are involved in learning activities with instructional materials for more than 90% of classroom time. Therefore, adequate direct instruction funding is critical to achieving educational excellence (as reflected in student achievement test scores).

This literature review will explore research reported on educational funding as it relates to allocations and expenditures for direct instruction and the relationship of such expenditures to student performance as reflected in norm-referenced, standardized achievement test scores. The review of the literature also will include research relating to allocations and expenditures based on school district size and student outcomes.

According to Wainer (1993), inadequate direct instruction funding leads to critical choices regarding the

selection (adoption) and replacement of instructional materials, and ultimately affects test scores. According to the National Education Association's (NEA) report, The Cost of Excellence: Federal Education Funding (1991), beginning in 1980, the posture of the United States government regarding the funding of public education could be described as disinvestment. A shift in commitment, accompanied by a decrease in federal funding earmarked for educational programs, " . . . hurt the quality of education and the quality of life for millions of American youth. The nation's economic and social conditions reflect the damage wreaked by this neglect" (p. 14). Further, the NEA cites this neglect has led to a ". . .crumbling school infrastructure . . . [and] inadequate textbook and equipment budgets" (p. 14).

Since public financial support of education in the United States has evolved through taxation of the citizenry, it generally has been accepted that most aspects of public education should be provided free (Dayton, 1993; Turner, 1959). According to Turner, parents believed their children should be provided all of the necessary instructional materials and associated tools and equipment to assure their success in the classroom and subsequently in adult life. Turner concluded:

> Since the school is primarily concerned with providing experiences which will enable children and youth to acquire the knowledge, skills, attitudes,

> and appreciation for the purpose of becoming effective citizens in a democratic society, an adequate amount of instructional material must be available. (p. 27)

Blosser (1985) reported that, while techniques of instructional delivery are important, the use of instructional materials influences student achievement and other outcomes. According to Talmage and Eash (1979), "instructional materials provide the physical media through which the intents of the curriculum are experienced" (p. 84).

Mehrens (1989) has suggested that the public increasingly favors greater accountability in education, both in terms of educational expenditures and student achievement. Holding teachers responsible for student achievement will ultimately result in better education, according to Wainer (1993). Whether objectively valid or not, reports Wainer, many persons assume that standardized achievement tests provide the best available data about student achievement levels. However, for educational administrators, a different perspective is apparent. Administrators recognize such data have limitations. One potential area of concern in the emphasis on accountability is that teachers may ultimately end up teaching to the test. According to Mehrens (1984),

> The only reasonable, direct inference you can make from a test score is the degree to which a student knows the content that the test samples. Any inference about why the student knows that content to that degree . . . is clearly a weaker inference. (p. 10)

Instructional Materials and Test Scores

Based on her findings, Ascher (1989) suggests that any relationship between school finance and student achievement is difficult to establish. She reports this is due to the fact that achievement test scores traditionally have reported achievement in basic skills only.

Another area of concern centers on the possible correlation between the level of instructional materials funding, expenditures, and test scores. In some studies, it has been reported that there is no significant correlation, yet others report there is some significance (Cooley, 1993). According to Summerside (1990), South Dakota ranks high on standardized test scores because of elements which are not readily quantifiable: strong and stable family units, small schools, and old-fashioned values.

While everyone involved in the education of our nation's children generally agrees that instructional materials are critical, not everyone maintains the same impression of what adequate funding is for the provision of these materials (The cost, 1991; Drake, 1994). Parents have expectations that their children will have textbooks issued for the classes in which they are enrolled. Teachers expect instructional materials to assist them in teaching the curriculum (Turner, 1959). School administrators and school board members support the inclusion of instructional materials, equipment and supplies in the educational

process, as supported by published school board policies, procedures and annual budget allocations (Odden & Picus, 1992). However, disparity exists among school boards regarding the level of this support in a district's budget (Profiles, 1996).

According to Renchler (1992):

> Research into the relationship between school expenditures and student achievement has not yet provided us with a clear understanding of where we can most effectively invest our educational dollars. (p. 4)

He poses questions as to whether or not funding dollars should be increased, decreased, or reallocated. If so, what should be the factor combinations? For instance, should these funds go for more instructional materials, increased teacher compensation, lower pupil/teacher ratios or staff development?

In 1989, Hanushek reported that he had reviewed 187 studies related to expenditures and student performance and concluded that overall educational expenditures generally were not related to student outcomes. Odden and Picus (1992) have reported that certain combinations of educational funding have not been found to lead to higher levels of student performance. They further state:

> The important message from this research is that if additional revenues are spent in the same way as current education revenues, student performance increases are unlikely to emerge. The message is that the way money is used matters. (p. 12)

Barton, Coley and Goertz (1991), analyzed the 1990 National Assessment of Educational Progress Report (NAEPR) which had concluded that, in 1988, high school students did not perform as well as their 1982 counterparts in the area of assessment. This same report suggested that relationships exist between systematic and substantial exposure (direct instruction) to academic subjects and higher scores on achievement tests in academic areas. Barton et al. (1991) concluded that the 1990 NAEPR showed a link between instructional materials and other teacher resources and the mathematics proficiency of students as reported on standardized student achievement tests.

In Illinois, a study was undertaken to examine the possible relationship between total per pupil expenditures and student state assessment exam scores (Sharp, W., 1993). Reading and mathematics tests were administered to students in grades 3, 6, 8 and 11. A language arts achievement test was given to students in grades 3, 6, and 8. A Pearson r correlation was calculated to see if there were any significant relationships between operating expenditures per pupil for the school year 1989-1990, and student achievement test scores as reported in the spring of 1991. It was determined that there was a small but statistically significant negative correlation between spending and achievement in every subject in every grade level tested,

with the exception of the 11th grade, where there was no significant correlation between the variables. One of the conclusions was that overall increased funding does not necessarily lead to increased student performance, primarily because the majority of expenditures go for personnel costs (Sharp, W., 1993).

As suggested above, the literature contains numerous research studies regarding total per student allocation in the United States generally and in individual states specifically (Back-to-school, 1993). Further, some research has concluded that total per pupil allocations are on the increase, while student performance is on the decline. However, the evidence to support this perception is questionable. For example, to report on administrators' salaries and expenditures for school bus and facilities maintenance as being directly related to student performance is not logical (School, 1993).

In 1992, the Mississippi legislature commissioned the Performance Evaluation and Expenditure Review, which found that students in districts with high administrative costs did not perform significantly better on standardized tests than students from districts spending less (School, 1993). Administrative costs were defined as central office administrator and building principal salaries.

In 1996, members of the Florida Senate introduced legislation (Specific Appropriation 143) which shifted

a percentage of previously budgeted local district noninstructional salaries to the local school district's instructional salaries budget category (State, 1996). There was a detailed calculation in the proviso language of this legislation instructing the districts on how to comply with the mandate. Further, in the subsequent budget year, any district found not to be in compliance with this mandate would be penalized the next budget year by an amount equal to the amount needed to bring the district into compliance, and those funds would be distributed to districts found to be in compliance with the requirement (State, 1996).

These redirected funds could go toward increasing teacher salaries, adding more teacher aides to the classroom or lowering pupil/teacher ratios. The proviso language specifically stated these redirected funds had to be added to a school district's previous year's instructional salaries budget total (State, 1996). Such a shift possibly could result in higher student achievement because of the greater infusion of funding into direct instruction (Wainer, 1993).

O'Neil, Fortune and Packard (1994) reported on production-function and correlation-based analyses done to evaluate the injection of financial resources into the educational process. They concluded that correlation-based analyses are not accurate measures of relationships between

expenditures in education and student performance. They suggested, instead, that t-tests and other tests of mean differences more accurately reflect such relationships. In their research, they analyzed data from states which had been involved in equity lawsuits--Missouri, Ohio, Pennsylvania, Rhode Island, South Dakota, and Virginia. Production-function analyses and t-tests were performed on these data. It was found that t-tests and mean differences evaluations indicated a "significant relationship between instructional expenditures and student achievement, a relationship which production-function analysis failed to show" (p. 27).

Funding and Achievement Tests

Glaser and Silver (1994) reported that assessment and testing reform in American public schools is currently in conflict with traditional, long-entrenched practices. They suggested that testing and teaching must work together for the improvement of instruction and increased student performance as reflected in student achievement test scores.

Stedman (1995) suggested that the four prevailing myths regarding the preparation and performance of American students are inaccurate at best. He provided evidence that SAT scores have not actually declined; rather, they are at an all-time high. American students performing above the 50th percentile on the SAT are internationally competitive. The true crisis in American education is not a question

regarding general education standards and practices in this country, according to Stedman. Rather, the crisis truly lies in the inner-city schools and the associated pervasive poverty. Stedman does support the idea, however, that general educational performance in this country, as represented by those scoring at the 50th percentile and lower on the SAT, continues to decline, as it has for the past several decades. Meaghan and Casas (1995) have suggested that inadequate achievement testing programs represent barriers to comprehensive educational reform because there is an insufficient yardstick with which to measure performance and progress.

Drake (1994) reported on the effect of differential spending among selected Missouri public school districts on student performance, as expressed through achievement test scores. He hypothesized that if a positive relationship could be verified as existing between spending patterns and student outcomes, then expenditures could be manipulated in order to increase student achievement test scores. In his study, Drake included only larger school districts, with his definition of larger referring to any district having at least 50 students in a particular grade. It should be noted that, in Missouri, school districts are synonymous with community structure. This is decidedly different from the school district structure in Florida where the districts are synonymous with county geographical

area. The types of data examined by Drake included per pupil expenditure and percentage of district budget expended on elementary, secondary and total instruction, guidance, salaries and benefits, all administrative costs, both at the district level and the individual school building level, as well as total student support services. Included in Drake's study were grades 3, 6, 8, and 10. The achievement test utilized in his study was the Missouri Mastery and Achievement Test.

Drake (1994) concluded that no single district budget category was positively correlated on a consistent basis with academic achievement at a statistically significant level. Additionally, he found that socioeconomic factors of the community were negatively correlated with student achievement. Attendance and graduation rates were positively correlated with achievement. Among his conclusions were that one of the best predictors of overall academic achievement within a school district is percentage of expenditure for total instruction and per pupil expenditure. However, such results on a district-by-district basis were not consistent. Drake's working definition of district size may limit the generalizability of his conclusions. Since Florida's school district structure is not equivalent to that in Missouri, it may be difficult to apply Drake's findings to questions regarding education funding and student performance in Florida public schools.

King and Ramirez (1994) have concluded from their research that "as long as funding inequities can be related to achievement gaps, per pupil expenditures will remain an important focus of discussion" (p. 36). Further research should be undertaken to consider the possible relationship between expenditures for direct instruction and student performance.

According to Cardenas (1992), there has been much discussion during the past decade regarding the controversy of whether or not increased funding truly will result in higher student achievement. Cardenas cited wealthy districts which were not affected by state funding for education and compared their test scores with those of students from poorer districts dependent upon state funding. He posed the question that, if funding makes no difference in student performance, why were wealthier districts reluctant to share their more than ample resources with poorer districts? Further research into a district's wealth (as reflected in per pupil expenditures for direct instruction) and student performance should be undertaken to increase knowledge in the area underlying this question.

Verstegen (1994), reporting on recent court cases related to student performance and funding, found courts generally ruling in favor of "equal opportunities for financing excellence in education" (p. 245). She also reported that, in one case, the court found achievement

test scores in poorer districts were lower than those in wealthier districts, and that there was a correlation between test scores and the wealth of a district.

Wainer (1993) found that high average per pupil expenditures can improve education, as evidenced by comparing reported average measures among various school districts and states with Scholastic Aptitude Test scores and associated funding. He found that, as per pupil expenditures increased, test scores also increased. Additional research in this area could substantiate the findings of this research or suggest other areas which should be explored with regard to funding and test scores.

Kimbrough's (1994) research examined data of students enrolled in adult education classes in Florida. He concluded that there is a significant relationship between funding for instructional supplies and student achievement as reported on the General Education Diploma Test.

Johnston (1990) conducted research wherein he attempted to measure the effect of local school district funding and class size on SAT and CAT scores in North Carolina using Pearson's r correlation and linear regression analysis. He found that funding had an effect on test scores but class size did not. Using linear regression analysis, Johnston was able to demonstrate the amount of funding that would be necessary to improve SAT scores of North Carolina high school students.

Research regarding per pupil funding and student achievement in Michigan was undertaken by Snyder (1995). The test used to measure student performance was the Michigan Educational Assessment Program (MEAP). He randomly selected various grade levels and academic content areas for his 12 sets of scores. In his work, Snyder examined independent variables of average teacher salaries, per pupil expenditures in operations, and per pupil expenditures in instructional categories. His findings indicated that little, if any, correlation existed between the variables used in his study and student achievement.

Picone (1993) investigated direct instructional expenditures and student performance in New Hampshire for students in grades 4, 8 and 10. He concluded from his research that there appeared to be "considerable evidence of a systematic difference in achievement levels of New Hampshire school districts on the basis of direct instructional expenditures" (p. 102).

Summary

The review of the literature revealed conflicting perceptions regarding the relationship between levels of student performance and per pupil expenditures for direct instruction, including instructional materials, library/ media resources, classroom supplies, classroom equipment, and salaries for teachers and teacher aides. Research conducted in other states may not be directly applicable

to public education needs in the state of Florida. With the increased emphasis on cost-cutting measures currently faced by states and local school districts regarding the delivery of public education, Florida's educators, legislators and local politicians are faced with difficult choices.

The state constitution of Florida mandates adequate educational funding, but does not define adequate. Lacking a specific definition of adequate, legislators, school boards, and educational administrators are left to their own interpretations. The present study considered parameters which focused on student performance and levels of funding and expenditures during the 1994-1995 school year.

Chapter III presents the methodology or research design of the two-part study. Included are the procedures and methods used in the collection of the data which were used as the analytical base, a description of the target population, the statistical methods used, and the procedures followed for the data analyses. The second part of the study was qualitative. Information was gathered through a ranking survey and analyzed to augment data analyses performed in the first part of the study. Also included is a summary of the methodology followed for Phase II of the study.

CHAPTER III
METHODOLOGY

Introduction

As evidenced throughout the literature, there are differing interpretations regarding the impact of the variance in per pupil expenditures for direct instruction on student performance outcomes as reflected in norm-referenced, standardized achievement test scores. Further research in the area of educational funding and expenditures with a focus on how they impact student performance was suggested by the literature review. Such an investigational study could provide insight for legislators related to such decision-making activities. Local school board members and district administrators also could be assisted by the findings of this study as they make crucial decisions regarding the most efficient allocation of finite resources.

This research study addressed some of these issues through the examination of the following question:

> Is there a relationship between per pupil direct instruction expenditures, per pupil instructional materials allocations and student performance on the Comprehensive Test of Basic Skills, Form A (CTB A) in reading and mathematics for Florida

public school fourth grade and eighth grade students when size of school district is considered?

Specifically, by examining public school per pupil instructional materials allocations, per pupil direct instruction expenditures, student performance, and size of district in the state of Florida, data were obtained which may assist educational leaders, school board members and those individuals involved in the political/legislative process in their decision-making activities. In the current climate of accountability, coupled with the emphasis on student performance--especially in the state of Florida--it was anticipated that this study would add knowledge to this area of educational research.

The purpose of this study was to determine if a relationship existed between per pupil instructional materials allocations, per pupil expenditures for direct instruction, school district size and student performance in Florida's public schools during the 1994-1995 school year. For purposes of this study, the term "per pupil" refers to one full-time equivalent (FTE) student as calculated by the State of Florida in the Florida Education Finance Program (1994) funding formula.

This study was specifically designed to investigate these possible relationships and to develop recommendations

which could be used to assist other investigators in future inquiries exploring these variables.

This research study focused on whether or not there was a relationship between per pupil instructional materials allocations, per pupil direct instruction expenditures, district size, and norm-referenced, standardized achievement test scores on the Comprehensive Test of Basic Skills, Form A (CTB A), for the school year 1994-1995 in Florida public schools for grades 4 and 8. The CTB A measures achievement in reading and mathematics only and is a subtest of the Stanford Achievement Test.

Target Population

As reported in Chapter I, the state of Florida ranked 27th nationally in total per pupil expenditures in 1992-1993 (see Table 3-1, following on pages 30 and 31). A study was undertaken to examine more closely a subset of total per pupil expenditures, by specifically targeting and examining per pupil direct instruction expenditures in Florida public schools, specifically with regard to student performance. In addition, per pupil instructional materials allocations were studied for the same target population, along with size of the school district. Norm-referenced, standardized achievement test scores in reading and mathematics were the measure of student performance. Public school districts in the state of Florida are enumerated in Table 3-2, page 32.

TABLE 3-1

UNITED STATES TOTAL PUBLIC SCHOOL (K-12) PER PUPIL EXPENDITURES, BY STATE AND THE DISTRICT OF COLUMBIA, FOR THE SCHOOL YEAR 1992-1993

RANKING	STATE	PER PUPIL EXPENDITURE
1	NEW JERSEY	$9,491
2	ALASKA	9,290
3	NEW YORK	8,794
4	CONNECTICUT	8,170
5	DISTRICT OF COLUMBIA	8,036
6	PENNSYLVANIA	6,914
7	VERMONT	6,731
8	RHODE ISLAND	6,649
9	MASSACHUSETTS	6,592
10	WISCONSIN	6,509
11	MARYLAND	6,447
12	DELAWARE	6,420
13	MICHIGAN	6,402
14	MAINE	6,162
15	OREGON	6,088
16	WYOMING	5,822
17	HAWAII	5,806
18	WEST VIRGINIA	5,698
19	NEW HAMPSHIRE	5,635
20	MINNESOTA	5,626
21	WASHINGTON	5,528
22	KANSAS	5,490
23	MONTANA	5,459
24	INDIANA	5,439
25	ILLINOIS	5,399
26	VIRGINIA	5,326
27	FLORIDA	5,314
28	OHIO	5,260
29	IOWA	5,184
30	COLORADO	5,050
31	KENTUCKY	4,942
32	NEVADA	4,929
33	TEXAS	4,900
34	NORTH CAROLINA	4,894
35	NEBRASKA	4,893
36	GEORGIA	4,730
37	SOUTH CAROLINA	4,669
38	NEW MEXICO	4,643

TABLE 3-1 (CONTINUED):

RANKING	STATE	PER PUPIL EXPENDITURE
39	CALIFORNIA	$4,620
40	MISSOURI	4,489
41	NORTH DAKOTA	4,404
42	SOUTH DAKOTA	4,367
43	LOUISIANA	4,330
44	ARIZONA	4,140
45	OKLAHOMA	4,085
46	TENNESSEE	4,033
47	IDAHO	4,025
48	ARKANSAS	3,838
49	ALABAMA	3,830
50	MISSISSIPPI	3,390
51	UTAH	3,218
AVERAGE UNITED STATES PER PUPIL EXPENDITURE:		$5,528

Source: Statistical abstract of the United States: 1995 (115th ed.). (1995), page 168. Washington, DC: U. S. Bureau of the Census.

In 1995, the State of Florida Department of Education required that norm-referenced, standardized achievement test scores be reported, but only for grades 4 and 8. There were only two academic areas for which test scores had to be reported. These were reading and mathematics. These reported test scores were examined to discern the target for this study.

Among the dozens of such test types available, those reported by Jozefczyk (1995) as being administered in the public school districts in the state of Florida during the spring of 1995 included:

TABLE 3-2

STATE OF FLORIDA PUBLIC SCHOOL DISTRICTS
IN ALPHABETIC SEQUENCE

ALACHUA	LAKE*
BAKER*	LEE*
BAY	LEON
BRADFORD*	LEVY*
BREVARD	LIBERTY*
BROWARD	MADISON
CALHOUN*	MANATEE
CHARLOTTE	MARION*
CITRUS	MARTIN
CLAY*	MONROE
COLLIER	NASSAU*
COLUMBIA*	OKALOOSA*
DADE	OKEECHOBEE*
DESOTO*	ORANGE
DIXIE*	OSCEOLA
DUVAL*	PALM BEACH*
ESCAMBIA	PASCO
FLAGLER*	PINELLAS*
FRANKLIN*	POLK*
GADSDEN*	PUTNAM*
GILCHRIST*	ST. JOHNS
GLADES*	ST. LUCIE
GULF*	SANTA ROSA*
HAMILTON	SARASOTA
HARDEE	SEMINOLE*
HENDRY	SUMTER*
HERNANDO	SUWANNEE
HIGHLANDS	TAYLOR
HILLSBOROUGH	UNION*
HOLMES*	VOLUSIA*
INDIAN RIVER*	WAKULLA
JACKSON*	WALTON*
JEFFERSON	WASHINGTON*
LAFAYETTE*	

Source: L. T. Jozefczyk (1995). State and district report of norm-referenced test results, grades 4 and 8, page 3. Tallahassee, FL: Florida Department of Education.

*District included in the target population (55% of total Florida public school districts).

a. The California Achievement Test, Form A (CAT A),

b. The California Achievement Test, Form E (CAT E),

c. The Comprehensive Assessment Program National Achievement Test, Form 3 (NAT 3),

d. The Comprehensive Test of Basic Skills, Form A (CTB A)(a subset of the Stanford Achievement Test measuring achievement in reading and mathematics),

e. The Iowa Test of Basic Skills, Form K (ITB K),

f. The Stanford Achievement Test, Form E (STA E),

g. The Stanford Achievement Test, Form J (STA J), and

h. The Stanford Achievement Test, Form L (STA L).

Table 3-3 (pages 34-35) and Table 3-4 (pages 36-37) list by district the various norm-referenced, standardized achievement test types administered in the public school districts in the state of Florida during the spring of 1995 for grades 4 and 8. This listing was compiled to determine the frequency of test type. The most frequently administered test was (d), above. Therefore, reported median national percentile rank (MNPR) test scores for all fourth and eighth grade students taking the Comprehensive Test of Basic Skills, Form A (CTB A), in the spring of 1995 were included in analyses performed in this study.

Research Design

Since 1992, all public school districts in Florida have been required to report annual student achievement test scores to the Florida Department of Education. In

TABLE 3-3

REPORTED STANDARDIZED ACHIEVEMENT TEST TYPES ADMINISTERED TO FOURTH GRADE STUDENTS IN ALL FLORIDA PUBLIC SCHOOL DISTRICTS FOR THE YEAR 1995

DISTRICT	TEST TYPE
ALACHUA	CAT E
BAKER	CTB A
BAY	CAT A
BRADFORD	CTB A
BREVARD	STA J
BROWARD	STA J
CALHOUN	CTB A
CHARLOTTE	STA L
CITRUS	ITB K
CLAY	CTB A
COLLIER	STA J
COLUMBIA	CTB A
DADE	STA J
DESOTO	CTB A
DIXIE	CTB A
DUVAL	CTB A
ESCAMBIA	CAT A
FLAGLER	CTB A
FRANKLIN	CTB A
GADSDEN	CTB A
GILCHRIST	CTB A
GLADES	CTB A
GULF	CTB A
HAMILTON	STA E
HARDEE	NAT 3
HENDRY	CAT E
HERNANDO	CAT A
HIGHLANDS	CAT A
HILLSBOROUGH	STA J
HOLMES	CTB A
INDIAN RIVER	CTB A
JACKSON	CTB A
JEFFERSON	ITB K
LAFAYETTE	CTB A
LAKE	CTB A
LEE	CTB A
LEON	CAT A
LEVY	CTB A
LIBERTY	CTB A
MADISON	CAT A
MANATEE	STA J

TABLE 3-3 (CONTINUED):

DISTRICT	TEST TYPE
MARION	NAT 3
MARTIN	CAT A
MONROE	STA J
NASSAU	CTB A
OKALOOSA	CTB A
OKEECHOBEE	CTB A
ORANGE	STA J
OSCEOLA	STA L
PALM BEACH	CTB A
PASCO	STA J
PINELLAS	CTB A
POLK	CTB A
PUTNAM	CTB A
ST. JOHNS	STA J
ST. LUCIE	STA J
SANTA ROSA	CTB A
SARASOTA	NAT 3
SEMINOLE	CTB A
SUMTER	CTB A
SUWANNEE	CAT E
TAYLOR	STA J
UNION	CTB A
VOLUSIA	CTB A
WAKULLA	CAT A
WALTON	CTB A
WASHINGTON	CTB A

Source: L. T. Jozefczyk (1995). State and district report of norm-referenced test results, grades 4 and 8, page 3. Tallahassee, FL: Florida Department of Education.

TABLE 3-4

REPORTED STANDARDIZED ACHIEVEMENT TEST TYPES
ADMINISTERED TO EIGHTH GRADE STUDENTS IN ALL FLORIDA
PUBLIC SCHOOL DISTRICTS FOR THE YEAR 1995

DISTRICT	TEST TYPE
ALACHUA	CAT E
BAKER	CTB A
BAY	CAT A
BRADFORD	CTB A
BREVARD	STA J
BROWARD	STA J
CALHOUN	CTB A
CHARLOTTE	STA L
CITRUS	ITB K
CLAY	CTB A
COLLIER	STA J
COLUMBIA	CTB A
DADE	STA J
DESOTO	CTB A
DIXIE	CTB A
DUVAL	CTB A
ESCAMBIA	CAT A
FLAGLER	CTB A
FRANKLIN	CTB A
GADSDEN	CTB A
GILCHRIST	CTB A
GLADES	CTB A
GULF	CTB A
HAMILTON	STA E
HARDEE	NAT 3
HENDRY	CAT E
HERNANDO	CAT A
HIGHLANDS	CAT A
HILLSBOROUGH	STA J
HOLMES	CTB A
INDIAN RIVER	CTB A
JACKSON	CTB A
JEFFERSON	ITB K
LAFAYETTE	CTB A
LAKE	CTB A
LEE	CTB A
LEON	CAT A
LEVY	CTB A
LIBERTY	CTB A
MADISON	CAT A
MANATEE	STA J

TABLE 3-4 (CONTINUED):

DISTRICT	TEST TYPE
MARION	CTB A
MARTIN	CAT A
MONROE	STA J
NASSAU	CTB A
OKALOOSA	CTB A
OKEECHOBEE	CTB A
ORANGE	STA J
OSCEOLA	STA L
PALM BEACH	CTB A
PASCO	STA J
PINELLAS	CTB A
POLK	CTB A
PUTNAM	CTB A
ST. JOHNS	STA J
ST. LUCIE	STA J
SANTA ROSA	CTB A
SARASOTA	NAT 3
SEMINOLE	CTB A
SUMTER	CTB A
SUWANNEE	CAT E
TAYLOR	STA J
UNION	CTB A
VOLUSIA	CTB A
WAKULLA	CAT A
WALTON	CTB A
WASHINGTON	CTB A

Source: L. T. Jozefczyk (1995). State and district report of norm-referenced test results, grades 4 and 8, page 4. Tallahassee, FL: Florida Department of Education.

1992, it was required that data for grades 4 and 7 in reading and mathematics be reported. For 1993 and subsequent years, data for grades 4 and 8 in reading and mathematics have been required to be reported. The specific norm-referenced, standardized test administered by the various districts in Florida is a local district option.

Phase I

This study was divided into two phases. In Phase I, district size, financial data and test data were collected and analyzed. Analyses were performed on an IBM PC using the statistical analysis computer program TSP Version 4.3A. Multiple regression analyses were performed utilizing ordinary least squares.

Phase II

After the statistical analyses were completed in Phase I, Phase II of the study was initiated. Phase II consisted of a qualitative survey designed to elicit information which was not readily quantifiable but which related to the variables analyzed in Phase I. Selected Florida public school district administrators were contacted to obtain their views regarding the relative importance of various factors affecting student performance as reflected in standardized achievement test scores.

The five school districts reporting the highest per pupil direct instruction expenditures and the five school districts reporting the lowest per pupil direct instruction

expenditures, as determined in Phase I, were targeted for participation in the qualitative survey portion of this study. This sample represented 10 of 37 districts for which data were examined in Phase I of this study. On a percentage basis, this was 27% of the districts in Phase I and represented 14.9% of the total public school districts in Florida. The information obtained from the survey was analyzed to determine the relative importance of the qualitative factors as influencing student performance.

Statement of the Variables

Factors which influence an outcome are called independent variables. The resulting outcome of the interaction of the independent variables is called the dependent variable.

In the present study, the independent variables were determined to be:

a. DISTR = district size,

b. EXPEND = per pupil direct instruction expenditures, and

c. ALLOC = per pupil instructional materials allocation.

The dependent variables were reading and mathematics scores for students in grade 4 and grade 8, designated as follows:

a. MATH4 = Grade 4 mathematics test score,

b. MATH8 = Grade 8 mathematics test score,

c. READ4 = Grade 4 reading test score, and

d. READ8 = Grade 8 reading test score.

Sources of Data

Financial data, district size information and test data utilized in this study were obtained from two Florida Department of Education documents: Profiles of Florida School Districts (1996), containing data for the school year 1994-1995, and the State and District Report of Norm-Referenced Test Results for Spring 1995.

Per pupil direct instruction expenditures reported for each public school district in Profiles (1996) were average per pupil, K-12. Any differentiation in direct instruction program allocations or weights were folded into the average per pupil direct instruction expenditures included in the report. Instructional materials allocations for each district, K-12, and the State of Florida as a whole also were reported in Profiles (1996).

For Phase II of this study, a survey instrument was developed to obtain information directly from the districts reporting the highest five and lowest five per pupil direct instruction expenditures in Profiles for 1994-1995. These districts represented 27.8% of the total number of districts in the fourth grade target population and 27.0% of the total number of districts in the eighth grade target population.

The selected districts were contacted to gather additional information to be included in this study. The

purpose of the survey was to elicit qualitative information from districts regarding factors which may have had an effect on student outcomes as reflected in the reported test scores but which were not readily quantifiable. These included:

a. level of per pupil direct instruction expenditures,
b. pupil/teacher ratio,
c. teacher's aide in classroom,
d. educational level of teacher,
e. experience level of teacher,
f. socioeconomic/family factors, and
g. special circumstances this year only (specify).

The district-level administrator having responsibility for the instructional materials program in each of the targeted districts was selected to be the initial contact person. After analyses of the data were completed, the appropriate district level instructional materials administrator was contacted by telephone. The individuals contacted included an associate superintendent, an assistant superintendent for instruction, a director for instructional programs, a coordinator for instructional materials, a supervisor for instructional materials, an instructional materials manager, a director of financial services, a supervisor of testing and research, and a teacher on special assignment for instructional materials.

The individuals were informed of the nature of the research and that participation was voluntary. After agreeing to review the survey, the administrators were sent an electronic facsimile of the survey. Included with the survey instrument was a memorandum to the participants, thanking them for their willingness to participate. Contained in the memorandum were instructions for returning the survey and a targeted completion date. Nine districts agreed to participate in the survey.

District administrators who chose to participate in the survey were informed they would be given a copy of the results, conclusions and recommendations of the study as compensation for their participation. A copy of the survey and the accompanying transmittal memorandum are included in the Appendix of this study (pages 101-106).

Method of Collection

The data utilized in this study were taken from the appropriate document and collapsed into tables reflecting those data. These tables included:

a. reported standardized achievement test types administered to fourth grade students in all Florida public school districts for the year 1995;

b. reported standardized achievement test types administered to eighth grade students in all

Florida public school districts for the year 1995;

c. norm-referenced, standardized achievement test frequency, by test type, administered to fourth grade students in the public schools of Florida in 1995;

d. norm-referenced, standardized achievement test frequency, by test type, administered to eighth grade students in the public schools of Florida in 1995;

e. reported direct instruction expenditures per pupil, grades K-12, all Florida public school districts, for school year 1994-1995;

f. reported total direct instruction expenditures, direct instruction expenditures per pupil and enrollment, all public school districts in Florida for 1994-1995;

g. reported state instructional materials allocation, instructional materials allocation per pupil, and enrollment, all public school districts in Florida, 1994-1995;

h. Florida public school districts K-12 enrollment for 1994-1995, in rank order;

i. instructional materials allocation per pupil, Florida public school districts, for 1994-1995, in rank order;

j. direct instruction expenditures per pupil, Florida public school districts, for 1994-1995, in rank order;

k. State instructional materials allocations, Florida public school districts, for 1994-1995, in rank order;

l. Florida public schools mathematics test scores, Comprehensive Test of Basic Skills (Form A), grade 4, 1995;

m. Florida public schools reading test scores, Comprehensive Test of Basic Skills (Form A), grade 4, 1995;

n. Florida public schools mathematics test scores, Comprehensive Test of Basic Skills (Form A), grade 8, 1995;

o. Florida public schools reading test scores, Comprehensive Test of Basic Skills (Form A), grade 8, 1995; and

The Florida Department of Education does not have an official designation of public school district size based on student enrollment (i.e., small-sized district, medium-sized district, and large-sized district). However, they do rank districts based on student enrollment. Data collected for district enrollment were collapsed into a table and listed in rank order from largest to smallest.

Method of Analysis

District-by-district aggregate median test scores [median national percentile rank (MNPR)], reported per pupil expenditures for direct instruction, and reported per pupil instructional materials allocations were combined into data sets for subsequent analysis. These data were organized by grade level, academic area (either reading or mathematics), name of district, number of students taking the test, and median national percentile rank.

Data were coded for statistical analysis and entered into a data base on an IBM PC computer. All data were verified for input accuracy prior to the initiation of any statistical analysis. Analyses were performed using TSP Version 4.3A for DOS/Windows. This program is noted for its ability to perform complex data analyses, with built-in compensators for nonlinearity.

Elements included two grade levels (grades 4 and 8), and a five-element basic record consisting of reported allocations, expenditures, number of students in each district, and two aggregate achievement test scores [median national percentile rank (MNPR)] per grade level (reading and mathematics), for each of the public school districts in Florida administering the CTB A during the spring of 1995.

Determination of the Model

Data were combined into scatter plots for determination of the appropriate mathematical model (linear or nonlinear) to be used in further analyses. Clustering patterns were examined to ascertain the tendency toward a line of best estimation. Analysis revealed that the appropriate functional form was a linear model. This is possible due to the logic in the TSP program used for the computer analyses.

Selection of the Model

According to Phelps (1992):

> While linear programming appears to address most of the criteria, the remaining few are so critical that they easily become "fatal" ....Nonlinear optimization addresses these two last criteria: (1) changing returns or nonlinear relationship between the outcomes and the effects; and (2) finding an optimal solution without having intersection between competing effects (some positive and some negative). (p. 32)

The nonlinear model, as proposed by Phelps (1992), contains a balancing effect, such that any negative value does not detract from any positive characteristics of the effects when included as factors in the model. Further, he suggests:

> Nonlinear optimization measures the multiple outcomes and the relationship between the outcome and effect in terms of the nonlinear and bounded values.
>
> Nonlinear optimization easily uses the nonlinear function of "cumulative standard normal probability." In many ways, this is

> the most unique feature of the education production model being presented.
>
> Nonlinear optimization allows--indeed requires--cost to be included as a constraint and provides the resulting interpretation of "what is the most efficient and effective combination of effects given the given costs constraint?"
>
> Nonlinear optimization allows the relationship between and among effects to be defined as additional constraints. (pp. 33-34)

Subsequent to the determination of the functional form, the model, $y = a + bx + e$, was selected for use in further analyses. The e (error) in this equation controlled for other factors which may have had an influence on the outcome, but which were unknown to the researcher. The intercept on the y axis was represented by a and the correlation coefficient (slope) was represented by b. This mathematical form yielded a least squares regressional analysis curve. The least squares model yields the curve of best fit, according to Spiegel (1995).

The Pearson product moment coefficient of correlation was calculated to measure the strength of the relationship between x and y. From Spiegel (1995), the Pearson product moment correlation coefficient takes the form:

$$r = \frac{S_{xy}}{S_x S_y} \quad . \quad \text{(p. 263)}$$

This test was performed to determine if there was a correlation between district size and median norm-referenced, standardized achievement test scores for mathematics and

reading at both grade levels included in this study. The test was repeated for per pupil direct instruction expenditures and per pupil instructional materials allocations.

These coefficients were analyzed to determine if there was a consistent positive correlation; i.e., as per pupil expenditures rise, so do indices of academic performance. The controlling variables for this analysis were the aggregate average direct instruction expenditure and the aggregate average instructional materials allocation.

The actual size of the student population across each grade level for each school district was not included as a determinant in this analysis. Due to the variance in the distribution size of the different grade levels, each grade level was examined separately. As a result, data utilized in this study were grouped by grade level to preclude inappropriate across-grade-level comparisons. A summary of all analytical outcomes are included at the end of Chapter IV.

Range of data

Ranges were determined for district size, per pupil direct instruction expenditures, and per pupil instructional materials allocations. They were also determined for fourth grade reading scores, fourth grade mathematics scores, eighth grade reading scores, and eighth grade mathematics scores. These data are included in Chapter IV.

Means

Means are averages of aggregate, similar data (e.g., average age of a sample population). Data means, as appropriate, were calculated and are reported in Chapter IV. Means were calculated separately for mathematics test scores and reading test scores for fourth grade and eighth grade. Means also were calculated for district size, per pupil direct instruction expenditures, and per pupil instructional materials allocations.

F ratio

The F ratio is a statistical test of the overall degree of fit of the estimated equations, while r^2 is a measure of the overall degree of fit. It shows how much the variation in the dependent variable is explained by the independent variables. The overall fit of the equation is considered statistically acceptable only if the computed value of the F ratio is greater than a critical value found in the table of F values. Tests of more than one coefficient at a time are typically done with the F test.

The F test is used to conduct tests of any linear hypothesis that involves more than one coefficient at a time. Such F tests should be used whenever the underlying theory implies a hypothesis that simultaneously specifies values for more than one coefficient (a joint or compound hypothesis). For example, it may be hypothesized in advance that the sum of slope coefficients $\beta_1 + \beta_2 + \beta_3 = 1$.

The F ratios were calculated to test the overall variation in the dependent variable as influenced by the independent variables. The independent variables were size of district (enrollment), per pupil direct instruction expenditures, and per pupil instructional materials allocations. Results of the F ratio analyses are reported in Chapter IV.

Summary

This chapter began with an introductory discussion of the nature of the problem to be examined in this research study and included a discussion of the target population and the design of the study. There were two phases to the study: (a) multiple regression analyses of the numerical data and (b) a qualitative survey of a subset of the target population.

The independent and dependent variables to be used in the analyses were identified and defined. The sources of data, methods of collection, model determination, selection of the model, and methods of analysis also were discussed.

The results of the study, including presentation of the data and analyses, are presented in Chapter IV. A summary of the findings is included at the end of the chapter.

CHAPTER IV
RESULTS

Introduction

The purpose of this study was to examine the impact of the variance in (a) per pupil expenditures for direct instruction, (b) per pupil instructional materials allocations, (c) and size of school district on student performance outcomes, as reflected in norm-referenced, standardized achievement test scores. The study consisted of two parts.

In Phase I, the relationship between student performance (as measured by the Comprehensive Test of Basic Skills, Form A) in grades 4 and 8, per pupil direct instruction expenditures, per pupil instructional materials allocations and district size of 37 public school districts in Florida during the 1994-1995 school year were examined. Multiple regression analyses were performed on the data after determination of the ordinary least squares using the TSP Version 4.3A statistical analysis package and an IBM PC computer.

In Phase II, 10 school districts were selected for to respond to a qualitative information survey related to the data obtained in Phase I. The districts reporting the five highest per pupil direct instruction expenditures

and the lowest five per pupil direct instruction expenditures were the districts selected. The results of the district surveys are included later in this chapter.

Further, this chapter includes the study's research question, the district data utilized in this research, and the relationships between the various independent variables and the dependent variable. A summary of the findings follows at the end of the chapter.

Research Question

The research question which served as the basis for this study was as follows:

> Is there a relationship between per pupil direct instruction expenditures, per pupil instructional materials allocations and student performance on the Comprehensive Test of Basic Skills, Form A (CTB A) in reading and mathematics for Florida public school fourth grade and eighth grade students when size of school district is considered?

Range of the Data

The reported values for each of the variables included in this study may be expressed as a range (the difference between the lowest value and the highest value). The range of district size of all public school districts in Florida extended from an enrollment of 862 to 302,382 (see

Table 4-1, pages 54-55). Enrollment data were obtained by dividing the district's reported total direct instruction expenditures by the reported average per pupil direct instruction expenditures, as reported in Profiles (1996). The range of the target population of the district size variable extended from 892 to 110,392. A delineation of the range is listed in Table 4-2 (page 56). Of the 37 districts in the study, nine districts were in the highest enrollment quartile, five districts were in the second highest quartile, 11 districts were in the third quartile and 12 districts were in the lowest quartile.

As reported in Profiles (1996), the range of per pupil direct instruction expenditures spanned from a low of $3,237 to a high of $4,681. It should be noted that one of the districts contacted during Phase II reported its per pupil direct instruction expenditures datum for 1994-1995 as being $5,515. This would increase the range from a high of $4,681 to a high of $5,515. A detailed listing of the range as reported in Profiles (1996) may be found in Table 4-3 (page 57).

The range of per pupil instructional materials allocations (I.M.A.) for the districts included in this study extended from a low of $40.85 to a high of $52.53. The per pupil I.M.A. for the districts were calculated using data reported in Profiles (1996). The total I.M.A. for

TABLE 4-1

FLORIDA PUBLIC SCHOOL DISTRICTS K-12 ENROLLMENT
FOR 1994-1995, IN RANK ORDER FROM
LARGEST TO SMALLEST

DISTRICT	ENROLLMENT	RANK
DADE	302,382	1
BROWARD	186,268	2
HILLSBOROUGH	121,032	3
PALM BEACH	110,392	4
ORANGE	109,563	5
DUVAL	103,934	6
PINELLAS	89,886	7
POLK	62,845	8
BREVARD	56,462	9
VOLUSIA	49,556	10
SEMINOLE	47,389	11
LEE	42,131	12
ESCAMBIA	38,723	13
PASCO	34,536	14
MARION	29,001	15
MANATEE	26,963	16
OKALOOSA	26,392	17
SARASOTA	26,097	18
LEON	25,936	19
ALACHUA	24,560	20
ST. LUCIE	22,943	21
COLLIER	22,571	22
OSCEOLA	21,946	23
CLAY	21,046	24
BAY	20,641	25
LAKE	20,420	26
SANTA ROSA	16,767	27
CHARLOTTE	13,275	28
ST. JOHNS	13,191	29
HERNANDO	13,149	30
MARTIN	11,973	31
CITRUS	11,593	32
INDIAN RIVER	11,467	33
PUTNAM	11,229	34
HIGHLANDS	9,335	35
MONROE	8,359	36
NASSAU	8,178	37
COLUMBIA	7,781	38
GADSDEN	7,236	39

TABLE 4-1 (CONTINUED):

DISTRICT	ENROLLMENT	RANK
JACKSON	6,810	40
HENDRY	5,855	41
OKEECHOBEE	5,344	42
SUWANNEE	4,944	43
LEVY	4,774	44
SUMTER	4,601	45
WALTON	4,523	46
HARDEE	4,462	47
FLAGLER	4,267	48
BAKER	3,867	49
DESOTO	3,725	50
WAKULLA	3,523	51
BRADFORD	3,368	52
HOLMES	3,276	53
TAYLOR	3,189	54
WASHINGTON	2,795	55
MADISON	2,789	56
HAMILTON	2,001	57
GILCHRIST	1,979	58
GULF	1,959	59
CALHOUN	1,913	60
DIXIE	1,858	61
UNION	1,792	62
JEFFERSON	1,736	63
FRANKLIN	1,443	64
LIBERTY	979	65
GLADES	900	66
LAFAYETTE	862	67

Source: Profiles of Florida school districts 1994-95 financial data statistical report, EIAS series 96-23 (May, 1996), pages 11-77. Tallahassee, FL: Florida Department of Education.

TABLE 4-2

RANGE OF DISTRICT SIZE (ENROLLMENT) INCLUDED IN STUDY, FROM LOWEST TO HIGHEST, FOR 1994-1995

DISTRICT	ENROLLMENT
LAFAYETTE	862
GLADES	900
LIBERTY	979
FRANKLIN	1,443
UNION	1,792
DIXIE	1,858
CALHOUN	1,913
GULF	1,959
GILCHRIST	1,979
WASHINGTON	2,795
HOLMES	3,276
BRADFORD	3,368
DESOTO	3,725
BAKER	3,867
FLAGLER	4,267
WALTON	4,523
SUMTER	4,601
LEVY	4,774
OKEECHOBEE	5,344
JACKSON	6,810
GADSDEN	7,236
COLUMBIA	7,781
NASSAU	8,178
PUTNAM	11,229
INDIAN RIVER	11,467
SANTA ROSA	16,767
LAKE	20,420
CLAY	21,046
OKALOOSA	26,392
MARION	29,001
LEE	42,131
SEMINOLE	47,389
VOLUSIA	49,556
POLK	62,845
PINELLAS	89,886
DUVAL	103,934
PALM BEACH	110,392

Source: Profiles of Florida schools districts 1994-95 financial data statistical report, EIAS series 96-23 (May, 1996), pages 11-77. Tallahassee, FL: Florida Department of Education.

TABLE 4-3

RANGE OF PER PUPIL DIRECT INSTRUCTION EXPENDITURES (D.I.E.), 1994-1995, FOR DISTRICTS INCLUDED IN STUDY, FROM LOWEST TO HIGHEST

DISTRICT	D.I.E. PER PUPIL
CLAY	$3,237
LAKE	3,253
BRADFORD	3,314
NASSAU	3,337
JACKSON	3,375
SEMINOLE	3,417
SANTA ROSA	3,428
COLUMBIA	3,444
OKALOOSA	3,450
BAKER	3,452
WASHINGTON	3,458
POLK	3,458
MARION	3,467
DUVAL	3,474
PUTNAM	3,478
CALHOUN	3,590
OKEECHOBEE	3,606
DESOTO	3,615
GADSDEN	3,664
SUMTER	3,675
LEVY	3,679
UNION	3,695
HOLMES	3,697
GILCHRIST	3,714
DIXIE	3,729
VOLUSIA	3,738
INDIAN RIVER	3,799
WALTON	3,807
PINELLAS	3,856
LIBERTY	3,863
LEE	3,866
FLAGLER	3,892
LAFAYETTE	3,931
FRANKLIN	3,940
PALM BEACH	4,095
GULF	4,275
GLADES	4,681

Source: Profiles of Florida schools districts 1994-95 financial data statistical report, EIAS series 96-23 (May, 1996), pages 11-77. Tallahassee, FL: Florida Department of Education.

each district was divided by the total reported district student population to arrive at the per pupil instructional materials allocation. The entire range is listed in Table 4-4 (page 59).

The range of fourth grade reading scores [median national percentile rank (MNPR)] extended from a low of 28 MNPR to a high of 66 MNPR score. One of the districts surveyed reported a reading score of 58 instead of 56. This reported difference did not affect the range. The detailed range as reported in Profiles (1996) may be found in Table 4-5 (page 60).

The range of fourth grade mathematics scores [median national percentile rank (MNPR)] spanned between a low of 24 MNPR to a high of 68 MNPR score. A detailed listing is given in Table 4-6 (page 61).

The range of eighth grade reading scores extended from a low of 22 MNPR to a high of 73 MNPR score. A complete listing of this range may be found in Table 4-7 (page 62).

The range of eighth grade mathematics scores spanned from a low of 24 MNPR to a high of 70 MNPR score. The detailed listing of scores in this range may be found in Table 4-8 (page 63).

Means

An analysis of the data sets yielded the following results with regard to the means:

TABLE 4-4

RANGE OF PER PUPIL INSTRUCTIONAL MATERIALS ALLOCATIONS (I.M.A.) FOR 1994-1995 FOR DISTRICTS INCLUDED IN STUDY, FROM LOWEST TO HIGHEST

DISTRICT	I.M.A. PER PUPIL
OKALOOSA	$40.85
GULF	40.94
FRANKLIN	41.07
GADSDEN	41.40
SEMINOLE	42.48
PUTNAM	42.59
HOLMES	42.82
NASSAU	43.45
LAFAYETTE	43.95
OKEECHOBEE	44.12
POLK	44.36
JACKSON	44.43
LIBERTY	44.43
BAKER	44.61
BRADFORD	44.68
CALHOUN	44.70
PINELLAS	44.80
DUVAL	44.81
VOLUSIA	44.98
CLAY	45.83
PALM BEACH	46.13
COLUMBIA	46.17
WASHINGTON	46.47
SUMTER	46.48
LEE	46.58
SANTA ROSA	46.69
LEVY	46.85
WALTON	47.19
UNION	47.58
LAKE	47.91
FLAGLER	48.33
INDIAN RIVER	48.35
DIXIE	48.97
MARION	49.45
DESOTO	49.79
GILCHRIST	51.53
GLADES	52.53

Source: Profiles of Florida schools districts 1994-95 financial data statistical report, EIAS series 96-23 (May, 1996), pages 11-77. Tallahassee, FL: Florida Department of Education.

TABLE 4-5

RANGE OF FOURTH GRADE READING TEST SCORES [MEDIAN NATIONAL PERCENTILE RANK (MNPR)], FLORIDA PUBLIC SCHOOL DISTRICTS INCLUDED IN STUDY, FOR 1994-1995

DISTRICT	MNPR
GADSDEN	28
DESOTO	30
GLADES	33
POLK	34
LAFAYETTE	37
LEVY	37
FRANKLIN	39
UNION	40
BAKER	44
COLUMBIA	44
DIXIE	44
BRADFORD	46
GULF	46
OKEECHOBEE	46
PUTNAM	48
GILCHRIST	49
INDIAN RIVER	49
SUMTER	49
JACKSON	50
LEE	50
DUVAL	51
LAKE	51
VOLUSIA	51
PALM BEACH	53
WASHINGTON	53
HOLMES	54
LIBERTY	54
CLAY	56
FLAGLER	56
NASSAU	56
SEMINOLE	56
WALTON	56
PINELLAS	63
SANTA ROSA	63
OKALOOSA	65
CALHOUN	66

Source: L. T. Jozefczyk (1995). State and district report of norm-referenced test results, grades 4 and 8, page 3. Tallahassee, FL: Florida Department of Education.

TABLE 4-6

RANGE OF FOURTH GRADE MATH TEST SCORES [MEDIAN NATIONAL PERCENTILE RANK (MNPR)], FLORIDA PUBLIC SCHOOL DISTRICTS INCLUDED IN STUDY, FOR 1994-1995

DISTRICT	MNPR
GLADES	29
DESOTO	30
GADSDEN	36
LEVY	38
DIXIE	39
GILCHRIST	39
GULF	39
POLK	40
BRADFORD	43
OKEECHOBEE	43
UNION	44
FRANKLIN	47
LAFAYETTE	48
COLUMBIA	49
PUTNAM	54
DUVAL	55
LIBERTY	59
SUMTER	60
VOLUSIA	60
HOLMES	61
BAKER	62
INDIAN RIVER	62
LAKE	62
LEE	62
WASHINGTON	63
NASSAU	66
PALM BEACH	67
CALHOUN	68
SEMINOLE	69
CLAY	70
JACKSON	70
PINELLAS	71
OKALOOSA	71
FLAGLER	71
SANTA ROSA	71
WALTON	73

Source: L. T. Jozefczyk (1995). State and district report of norm-referenced test results, grades 4 and 8, page 3. Tallahassee, FL: Florida Department of Education.

TABLE 4-7

RANGE OF EIGHTH GRADE READING TEST SCORES [MEDIAN NATIONAL PERCENTILE RANK (MNPR)], FLORIDA PUBLIC SCHOOL DISTRICTS INCLUDED IN STUDY, FOR 1994-1995

DISTRICT	MNPR
GADSDEN	22
DESOTO	41
DIXIE	45
POLK	47
PUTNAM	49
BRADFORD	50
GLADES	50
FRANKLIN	51
OKEECHOBEE	51
GULF	53
LAFAYETTE	53
LAKE	53
SUMTER	54
COLUMBIA	55
LEE	55
BAKER	56
GILCHRIST	56
JACKSON	56
DUVAL	59
HOLMES	59
NASSAU	60
PALM BEACH	61
CALHOUN	62
LIBERTY	62
UNION	62
WASHINGTON	62
MARION	63
SANTA ROSA	63
WALTON	63
CLAY	65
SEMINOLE	65
INDIAN RIVER	66
VOLUSIA	66
FLAGLER	67
LEVY	68
PINELLAS	69
OKALOOSA	73

Source: L. T. Jozefczyk (1995). State and district report of norm-referenced test results, grades 4 and 8, page 4. Tallahassee, FL: Florida Department of Education.

TABLE 4-8

RANGE OF EIGHTH GRADE MATH TEST SCORES [MEDIAN NATIONAL PERCENTILE RANK (MNPR)], FLORIDA PUBLIC SCHOOL DISTRICTS INCLUDED IN STUDY, FOR 1994-1995

DISTRICT	MNPR
GADSDEN	24
DIXIE	29
DESOTO	33
LAFAYETTE	35
POLK	39
BRADFORD	41
GULF	41
GILCHRIST	42
PUTNAM	43
MARION	46
OKEECHOBEE	46
NASSAU	47
LEVY	48
COLUMBIA	50
FRANKLIN	50
LEE	50
UNION	50
GLADES	52
HOLMES	52
LAKE	52
WASHINGTON	52
SUMTER	53
JACKSON	54
VOLUSIA	54
WALTON	54
DUVAL	56
INDIAN RIVER	56
LIBERTY	57
BAKER	59
CALHOUN	60
CLAY	60
PALM BEACH	61
PINELLAS	61
SEMINOLE	62
FLAGLER	66
SANTA ROSA	68
OKALOOSA	70

Source: L. T. Jozefczyk (1995). State and district report of norm-referenced test results, grades 4 and 8, page 4. Tallahassee, FL: Florida Department of Education.

1. For the grade 4 mathematics test scores included in this study, the mean of the median national percentile rank was 55 (55.31), with a low of 29 and a high of 73.

2. For the grade 4 reading test scores included in this study, the mean of the median national percentile rank was 49 (48.53), with a low of 28 and a high of 66.

3. For the grade 8 mathematics test scores included in this study, the mean of the median national percentile rank was 51 (50.62), with a low of 24 and a high of 70.

4. For the grade 8 reading test scores included in this study, the mean of the median national percentile rank was 57 (57.08), with a low of 22 and a high of 73.

5. For the districts included in this study, the mean size was 19,380 students, with a low of 862 students and a high of 110,392 students. The median value for district size was 11,229.

6. For the per pupil direct instruction expenditures included in this study, the mean was $3,660.78, with a low of $3,237 and a high of $4,681.

7. For the per pupil instructional materials allocations, the mean was found to be $44.43, with a low of $40.85 and a high of $52.53.

Analysis of the Data

The data utilized in this study were examined for the purpose of selecting the independent variables, the dependent variable, and functional form. A number of variables

were suggested by the data that should help explain the results of the reading and mathematics test scores included in the study.

There are three major determinants of test results upon which there appear to be general agreement in the education community. These are district size, per pupil direct instruction expenditures, and per pupil instructional materials allocations. It was determined that district size, per pupil direct instruction expenditures, and per pupil instructional materials allocations were the independent variables and student performance (test scores) was the dependent variable.

The definitions of the selected independent variables included in this study were:

a. DISTR = district size (the number of students in each of the 37 school districts included in the study, grades K-12, inclusive,

b. EXPEND = expenditures (average direct instruction expenditures per student [grades K-12] in each district), and

c. ALLOC = allocation (average instructional materials allocation per student [grades K-12] in each district).

The dependent variables included in this study were:

a. MATH4 = grade 4 mathematics score,

b. MATH8 = grade 8 mathematics score,

c. READ4 = grade 4 reading score, and

d. READ8 = grade 8 reading score.

Preliminary analysis of the data (plotting) showed that there was no reason to suspect anything other than a linear functional form for further analytical purposes. Thus, equations developed for subsequent analyses were of the linear form. A regression model was developed to explain the relationship between district size, per pupil direct instruction expenditures, per pupil instructional materials allocations and student performance (test scores).

To hypothesize the expected signs of the correlation coefficients, the following variables were included with their anticipated corresponding signs:

$$\text{MATH4} = f(\overset{-}{\text{DISTR}}, \overset{+}{\text{EXPEND}}, \overset{+}{\text{ALLOC}})$$

$$= \beta_0 + \beta_1 \text{DISTR} + \beta_2 \text{EXPEND} + \beta_3 \text{ALLOC} + \varepsilon_i .$$

It is was assumed for purposes of this study that the larger the size of a school district, the greater number of students in each classroom. Such a situation would lead to less interactive time between individual students and the teacher. Thus, the expected impact of the independent variable, DISTR, on the dependent variable, MATH4, holding constant the other two independent variables (EXPEND and ALLOC), was negative.

In addition, in those instances where more money was spent on mathematics classes, it was expected that there

should be higher test scores. Thus, the expectation of the sign of the independent variable, EXPEND, was positive. Further, it was logical to expect that with more money being expended on instructional materials (e.g., textbooks, workbooks, computer software), the result should be higher test scores, yielding a positive sign for the independent variable, ALLOC.

In summation, then, the functional forms arising out of the research question included in this study and an analysis of the variables were as follows:

$$\text{MATH4} = f(\overset{-}{\text{DISTR}}, \overset{+}{\text{EXPEND}}, \overset{+}{\text{ALLOC}})$$

$$= \beta_0 + \beta_1\text{DISTR} + \beta_2\text{EXPEND} + \beta_3\text{ALLOC} + \varepsilon_i,$$

$$\text{MATH8} = f(\overset{-}{\text{DISTR}}, \overset{+}{\text{EXPEND}}, \overset{+}{\text{ALLOC}})$$

$$= \alpha_0 + \alpha_1\text{DISTR} + \alpha_2\text{EXPEND} + \alpha_3\text{ALLOC} + \varepsilon_{ii},$$

$$\text{READ4} = f(\overset{-}{\text{DISTR}}, \overset{+}{\text{EXPEND}}, \overset{+}{\text{ALLOC}})$$

$$= \gamma_0 + \gamma_1\text{DISTR} + \gamma_2\text{EXPEND} + \gamma_3\text{ALLOC} + \varepsilon_{iii}, \text{ and}$$

$$\text{READ8} = f(\overset{-}{\text{DISTR}}, \overset{+}{\text{EXPEND}}, \overset{+}{\text{ALLOC}})$$

$$= \delta_0 + \delta_1\text{DISTR} + \delta_2\text{EXPEND} + \delta_3\text{ALLOC} + \varepsilon_{iiii},$$

where

MATH4 = 4th grade math test score;

MATH8 = 8th grade math test score;

READ4 = 4th grade reading test score;

READ8 = 8th grade reading test score; and

ε_i, ε_{ii}, ε_{iii}, ε_{iiii} = the typical stochastic error

terms (the effects of other variables excluded, plus the errors of measurement).

To estimate and evaluate the equations, the collected data sets were entered into a computer data base for subsequent analysis. Multiple regression analyses were performed, using ordinary least squares. The results are reported in Table 4-9 (page 69) and Table 4-10 (page 70).

The estimated equations resulting from these regression analyses were as follows:

(1) MATH4 = 38.06 + 3.4 DISTR - 32.72 EXPEND - 22.77 ALLOC

$n = 36$

$r^2 = .235$

$\bar{r}^2 = .163$;

(2) MATH8 = -16.08 + 2.58 DISTR + 4.93 EXPEND + 0.84 ALLOC

$n = 37$

$r^2 = .114$

$\bar{r}^2 = .033$;

(3) READ4 = 23.46 + 1.81 DISTR - 19.67 EXPEND - 10.7 ALLOC

$n = 36$

$r^2 = .142$

$\bar{r}^2 = .062$;

(4) READ8 = -24.50 + 1.86 DISTR + .126 EXPEND + 16.73 ALLOC

$n = 37$

$r^2 = .0817$

$\bar{r}^2 = -.0018$;

TABLE 4-9

RESULTS OF LEAST SQUARES REGRESSION ANALYSES OF DATA FOR FOURTH GRADE DEPENDENT VARIABLES MATH4 AND READ4

VARIABLE	COEFFI-CIENT	CALCU-LATED F	r^2	$\bar{r}^2$	TABULAR F*
MATH4:		3.2751	.234913	.16318	4.15
β_1DISTR	3.36742				
β_2EXPEND	-32.7158				
β_3ALLOC	-22.7700				
READ4:		1.7695	.142292	.06188	4.15
γ_1DISTR	1.80979				
γ_2EXPEND	-19.6653				
γ_3ALLOC	-10.7052				

*With 32 degrees of freedom and significance level of .05. Taken from Theory and problems of statistics, 2nd edition (p. 490), by M. R. Spiegel (1995), New York, NY: McGraw-Hill, Inc.

TABLE 4-10

RESULTS OF LEAST SQUARES REGRESSION ANALYSES OF DATA FOR EIGHTH GRADE DEPENDENT VARIABLES MATH8 AND READ8

VARIABLE	COEFFICIENT	CALCULATED F	r^2	$\bar{r}^2$	TABULAR F*
MATH8:		1.4160	.114053	.03351	4.14
α_1DISTR	2.58173				
α_2EXPEND	4.92818				
α_3ALLOC	0.839173				
READ8:		0.978268	.081670	-.181431E-02	4.14
δ_1DISTR	1.86286				
δ_2EXPEND	0.126096				
δ_3ALLOC	16.7324				

*With 33 degrees of freedom and significance level of .05. Taken from Theory and problems of statistics, 2nd edition (p. 490), by M. R. Spiegel (1995), New York, NY: McGraw-Hill, Inc.

As stated in Chapter III, in multiple regression analysis, the inclusion of other variables requires the estimation of the coefficients of correlation. This lessens the degrees of freedom over the number of coefficients. For this reason, when an ordinary least squares analysis is performed using a computerized program, the program will automatically calculate an adjusted r^2 (written as $\bar{r}^2$) to be used in place of r^2 when evaluating the fit of their estimated regression equations. Sometimes, adjusted r^2 is so important that it replaces r^2 in many reported regression results.

The quality of fit of an estimated equation is only one measure of the overall quality of that regression. The degrees to which the estimated coefficients conform to the previous expectations about the coefficients are just as important as, if not more important than, the fit itself. An estimated equation may have a lower adjusted r^2 with plausible signs of estimated coefficients (slopes) that indicate plausible predictions for useful decision making.

F ratio

While r^2 is a measure of the overall degree of fit of an estimated equation, the F ratio is a statistical test of the overall degree of fit. It demonstrates how much the variation in the dependent variable is explained by the independent variables. The overall fit of the

equation is considered to have statistical significance only if the computed (calculated) value of the F ratio is greater than a critical value found in the table of F values. The F values used in this study were taken from Spiegel (1995).

When analyzing the results, it was anticipated that the independent variable, DISTR (district size), would have a negative impact on student performance, and the coefficient, therefore, would carry a negative sign. The assumption, for purposes of this study, was that as district size increases, class sizes are likely to increase also, limiting the interactive time between teachers and individual students.

For the independent variables, EXPEND and ALLOC, it was assumed that increasing per pupil expenditures for direct instruction and per pupil instructional materials allocations would have a positive impact on student performance. Thus, it was anticipated that the correlation coefficients for EXPEND and ALLOC would be positive across all grade levels and all test scores.

As was seen previously from the data presented in Tables 4-9 and 4-10 (page 69-70), the calculated signs of the independent variable coefficients yielded varying results. For instance, there was a positive correlation coefficient for district size (DISTR); i.e., as district size increased, so did student performance. This was true

across all grade levels and all test scores as reported in this study.

For the independent variables, per pupil direction instruction expenditures (EXPEND) and per pupil instructional materials allocations (ALLOC), the correlation coefficients for MATH4 and READ4 were negative. However, they were positive for MATH8 and READ8.

When considering the significance of the findings for grade 4, it was found that the computed (calculated) F for MATH4 was 3.2751. When compared to the tabular F of 4.15, there was no significance at the .05 rejection level because the calculated F was less than the tabular F. For READ4, the computed F was determined to be 1.7695. When compared to the tabular F of 4.15, again, there was no significance at the .05 rejection level because the calculated F was less than the tabular F.

An analysis of the data for grade 8 yielded the following results: it was found that the calculated F for MATH8 was 1.4160. When compared to the tabular F of 4.14, there was no significance at the .05 rejection level because the calculated F was less than the tabular F. For READ8, the calculated F was determined to be .0978268. This was less than the tabular F of 4.14, so there was no significance at the .05 rejection level.

Qualitative Survey of Districts

Ten of the 37 school districts included in this study were selected for participation in a qualitative survey in order to obtain additional information regarding the factors analyzed in Phase I of this study. Clay, Lake, Bradford, Nassau and Jackson counties represented the five lowest rates of per pupil direct instruction expenditures as reported to the Florida Department of Education. Lafayette, Franklin, Palm Beach, Gulf and Glades counties represented the reported five highest per pupil direct instruction expenditures rates. Per pupil direct instruction expenditures and test scores for these 10 districts are reported in Table 4-11 (page 75).

Nine of the 10 districts were contacted by telephone. The district staff in the nine participating districts were first informed that the call was in regard to a doctoral research survey and that their participation was optional. The statement regarding voluntary participation was read and the respondents were asked if they wished to continue. All of the districts contacted (nine) agreed to having the survey transmitted electronically for further consideration. One district opted not to respond to telephone calls or electronic facsimiles regarding participation. Some of the administrators who were contacted stated they would have to defer to other administrators in their districts to respond to the survey because they did not have direct

TABLE 4-11

BASIC DATA FOR DISTRICTS SELECTED TO BE INCLUDED IN THE QUALITATIVE SURVEY

DISTRICT	D.I.E. PER PUPIL	GRADE 4 READ	GRADE 4 MATH	GRADE 8 READ	GRADE 8 MATH
		LOW FIVE DISTRICTS			
CLAY	$3,237	56	70	65	60
LAKE	3,253	51	62	53	52
BRADFORD	3,314	46	43	50	41
NASSAU	3,337	56	66	60	47
JACKSON	3,375	50	70	56	54
		HIGH FIVE DISTRICTS			
LAFAYETTE	3,931	37	48	48	53
FRANKLIN	3,940	39	47	51	50
PALM BEACH	4,095	53	67	61	61
GULF	4,275	46	39	53	41
GLADES	4,681	33	29	50	52

Note: The data in column 1 are from Profiles of Florida school districts 1994-95 financial data statistical report, EIAS series 96-23 (May, 1996), pages 14-60. Tallahassee, FL: Florida Department of Education. The data in columns 2 through 5 are from L. T. Jozefczyk (1995). State and district report of norm-referenced test results, grades 4 and 8, pages 3-4. Tallahassee, FL: Florida Department of Education.

access to the information which was being requested. It was determined that all participants had access to an electronic facsimile machine for receiving and transmitting copies of the survey form. Participants were informed of the requested return date of the completed survey form. Some participants indicated that additional time beyond the projected return date might be needed.

Survey components

The following elements were included in the survey: a memorandum of transmittal was included to explain the purpose of the survey (see Appendix, page 102). Page 1 of the survey (see Appendix, page 103) contained information regarding the nature of the survey, including the names of the committee chairperson and cochairperson and contact information. This page also included discussion that participation was voluntary and that the survey process could be terminated at any time at the discretion of the participant without prejudice. The survey also included the stamp of approval of the Institutional Review Board of the University of Florida.

Pages 2 and 3 of the survey (see Appendix, pages 104-105) contained only data specific to each district which had been obtained from the two Florida Department of Education documents used as the sources of data for this study. Included were data on per pupil direct instruction expenditures and reported test scores for reading and

mathematics for grades 4 and 8. Participants were asked to verify the data. If data were found to be incorrect, it was requested that they provide the correct data.

Also included on page 3 of the survey was a question which was intended to elicit qualitative information related to this research. The question requested participants to provide their opinions, in rank order, of proposed factors which influenced reading and mathematics test scores for their fourth and eighth students during the 1994-1995 school year. The question was as follows:

> In your opinion, what factors influenced your district's test scores, as referenced above, for the 1994-1995 school year? (Please prioritize your response to this question, with "1" reflecting the greatest influence and "6" reflecting the least influence.)
>
> a. Level of per pupil direct instruction expenditures.
> b. Pupil/teacher ratio.
> c. Teacher's aide in classroom.
> d. Educational level of teacher.
> e. Experience level of teacher.
> f. Socioeconomic/family factors.
> g. Special circumstances this year only (please specify).

Page 4 of the survey (see Appendix, page 106) provided space for the participants to include other information which they deemed important but which was not addressed in items (a) through (g), above.

Survey Responses

A total of six of the ten targeted districts provided responses to the survey. Four districts sent responses following the initial request. One district responded after a second request, and one district provided verbal information during a follow-up telephone call.

Two district administrators stated they never received the survey. They were sent the survey by electronic facsimile after verification of the correct telephone number. No responses were received as a result of the second transmissions. During a follow-up inquiry to a third district, it was learned that the individual to whom the survey had been sent had been reassigned and the survey had been misplaced. It was requested that the survey be re-sent, to be forwarded to the appropriate staff member for response. This was done, but the survey was not returned. The tenth district in the sample opted to not participate.

Of the six districts which provided responses, one opted not to prioritize the factors included in the survey. Of the five districts which provided ratings, the following results were obtained.

The most important factor was pupil/teacher ratio, with a priority rating of 1.80 (with 1 being the most influential). Two factors received the same total scores and mean scores. These were experience level of the teacher and socioeconomic/family factors. The scores ranged from 2 to 3 for experience level of teacher and from 1 to 4 for socioeconomic/family factors. The next most important factor was level of per pupil direct instruction expenditures, with ratings from 3 to 5. The fifth most important factor was educational level of the teacher, with ratings between 4 and 6. The sixth, and last, factor was teacher's aide in the classroom, with scores ranging between 4 and 6. Summaries of the survey results may be found in Table 4-12 (page 80) and Table 4-13 (page 81).

In Table 4-14 (page 82), a comparison is made of responses based on the mean response scores for the responding districts having the highest per pupil direct instruction expenditures and the responding districts having the lowest per pupil direct instruction expenditures. While the overall priority ratings are generally the same, the responding low districts ranked pupil/teacher ratio higher than did the responding high districts (1.67 versus 2.00). The responding high districts ranked experience level of teacher and socioeconomic/family factors slightly higher than the responding low districts (2.00 versus 2.33). The responding low districts ranked level of per pupil

TABLE 4-12

QUALITATIVE SURVEY RESPONSES: PRIORITY RATINGS
OF FACTORS INFLUENCING STUDENT PERFORMANCE

	FACTOR	DISTRICT									
		1	2	3	4	5	6	7	8	9	10
A.	LEVEL OF PER PUPIL DIRECT INSTRUCTION EXPENDITURES	5	NR*	NR	3	4	4	NR	5	NR	NR
B.	PUPIL/TEACHER RATIO	1	NR	NR	1	3	1	NR	3	NR	NR
C.	TEACHER'S AIDE IN CLASSROOM	6	NR	NR	6	6	6	NR	4	NR	NR
D.	EDUCATIONAL LEVEL OF TEACHER	4	NR	NR	5	5	5	NR	6	NR	NR
E.	EXPERIENCE LEVEL OF TEACHER	3	NR	NR	2	2	2	NR	2	NR	NR
F.	SOCIOECONOMIC/ FAMILY FACTORS	2	NR	NR	4	1	3	NR	1	NR	NR

*NR = No rating or no report.

TABLE 4-13

QUALITATIVE SURVEY MEAN RESPONSE PRIORITY RATINGS
OF FACTORS INFLUENCING STUDENT PERFORMANCE

FACTOR	MEAN RESPONSE PRIORITY RATING*
PUPIL/TEACHER RATIO	1.80
EXPERIENCE LEVEL OF TEACHER	2.20
SOCIOECONOMIC/FAMILY FACTORS	2.20
LEVEL OF PER PUPIL DIRECT INSTRUCTION EXPENDITURES	4.20
EDUCATIONAL LEVEL OF TEACHER	5.00
TEACHER'S AIDE IN CLASSROOM	5.60

*RATING SCALE: 1 = greatest influence; 6 = least influence of factors listed.

TABLE 4-14

QUALITATIVE SURVEY MEAN RESPONSE PRIORITY RATINGS OF FACTORS INFLUENCING STUDENT PERFORMANCE FOR RESPONDING HIGH EXPENDITURES AND LOW EXPENDITURES DISTRICTS

FACTOR	MEAN RESPONSE PRIORITY RATING*	
	HIGH	LOW
PUPIL/TEACHER RATIO	2.00	1.67
EXPERIENCE LEVEL OF TEACHER	2.00	2.33
SOCIOECONOMIC/FAMILY FACTORS	2.00	2.33
LEVEL OF PER PUPIL DIRECT INSTRUCTION EXPENDITURES	4.50	4.00
EDUCATIONAL LEVEL OF TEACHER	5.50	4.67
TEACHER'S AIDE IN CLASSROOM	5.00	6.00

*RATING SCALE: 1 = greatest influence; 6 = least influence of factors listed.

direct instruction expenditures higher than did the responding high expenditures districts (4.00 versus 4.5). The responding low expenditures districts ranked educational level of teacher at 4.67, while the responding high expenditures districts ranked this factor at 5.50. The responding high expenditures districts ranked teacher's aide in the classroom higher than the responding low expenditures districts (5.00 versus 6.00).

In addition to the factors listed in the survey, four other factors affecting student performance on standardized tests were suggested by respondents: (a) time on task, (b) test burnout, (c) quality of instructional expenditures, and (d) quality of teacher (rather than experience level of teacher or educational level of teacher). The district suggesting test burnout as a factor indicated that for the year included in this study, the CTBS was administered two months later than in previous years.

One district responded that their per pupil direct instruction expenditure was high because of the small student population in their district and the minimum level of operational costs associated with direct instruction, regardless of the number of student. It was indicated that they could easily provide services for an additional 400 students in their district without increasing costs or decreasing services to the total student population.

Some differences were reported by respondents regarding reported test sores and per pupil direct instruction expenditures. In one instance, the fourth grade reading score was self-reported to be 58 instead of 56, as was reported by Jozefczyk (1995). Additionally, this district self-reported an eighth-grade math score of 61 and an eighth grade reading score of 66. These were reported by Jozefczyk (1995) as 60 and 65, respectively. The discrepancies regarding these scores possibly may be due to rounding errors in calculations. One district reported that its per pupil direct instruction expenditures amount actually was $1,420 higher than that reported in Profiles (1996). None of these discrepancies were considered significant enough to alter the overall results of the statistical analyses performed in this study.

Summary

In Phase I of the research, data for fourth grade and eighth grade students in 37 public school districts in Florida for the school year 1994-1995 were analyzed. The data were analyzed to ascertain the correlations between district size, per pupil direct instruction expenditures and per pupil instructional materials allocations and student performance as expressed in test scores for reading and mathematics.

Data were collapsed into tables and were entered into a computer data base for subsequent analysis using an IBM

PC and the statistical analysis program TSP Version 4.3A. Multiple regression analyses were performed utilizing ordinary least squares. Positive correlations were found between district size and student performance for both grades 4 and 8; i.e., as district size increased, so did test scores. Negative correlations were found between per pupil direct instruction expenditures and student performance, as well as between per pupil instructional materials allocations and student performance (as reflected in test scores in reading and mathematics for fourth and eighth grade students). No significance was found for any of the variables at the .05 rejection level.

Chapter V contains the discussion of the results of the study, including a summary of the conclusions. Implications of the study and recommendations for further study follow the summary.

CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

Introduction

The purpose of this study was to examine the impact of the variance in (a) per pupil expenditures for direct instruction, (b) per pupil instructional materials allocations, and (c) size of school district on student performance outcomes, as reflected in norm-referenced, standardized achievement test scores. This chapter includes a discussion of the results of the study, conclusions, implications, a summary, and recommendations for future study.

The research question used as the basis for this research was as follows:

> Is there a relationship between per pupil direct instruction expenditures, per pupil instructional materials allocations and student performance on the Comprehensive Test of Basic Skills, Form A (CTB A), in reading and mathematics for Florida public school fourth grade and eighth grade students when size of school district is considered?

The study consisted of two parts. In Phase I, the relationship between student performance in reading and mathematics in 1994-1995 and district size, per pupil direct instruction expenditures and per pupil instructional materials allocations for fourth and eighth grade students in 37 of Florida's public school districts was examined. The measure of student performance was the Comprehensive Test of Basic Skills, Form A. Multiple regression analyses were performed on the data after determination of the model. The TSP Version 4.3A computer statistical package was used on an IBM PC for these analyses. Discussion of the findings are included later in this chapter.

In Phase II of the study, a qualitative survey was developed which included factors from Phase I. The purpose of Phase II was to elicit information from district administrators which would augment and supplement data analyses performed in Phase I. Ten districts were selected to respond to the survey. The districts reporting the five highest per pupil direct instruction expenditures and the lowest five per pupil direct instruction expenditures were targeted. The results of the district surveys are included in this chapter following the discussion of Phase I. Further, this chapter includes the conclusions, implications, a summary, and recommendations for further study.

Conclusions and Implications

Analysis of data

Four equations were developed for the regression analyses. The estimated equation for MATH4 was not supported by the regression analysis. The actual analysis yielded coefficients with signs different from those in the estimated equation. The hypothesized equation suggested a negative sign for district size and positive signs for per pupil direct instruction expenditures and per pupil instructional materials allocation. The regression analysis yielded a positive sign for district size and negative signs for expenditures and allocation.

For purposes of this study, it was assumed that as district size increased, class size would also increase, resulting in a negative effect on student performance. This was due to an additional assumption that individual pupil-teacher interaction time would be less and, therefore, have a negative effect on test scores. It was also assumed that the more money expended for direct instruction, and the more the instructional materials allocation was increased, the more student performance would increase; i.e., a positive relationship would exist. At grade 4, this was not borne out by analysis of the data for either reading or mathematics. These findings are in agreement with those of Wise (1968).

The estimated equation for MATH8 generally was similar to the equation yielded in the computer analysis, except for the incorrect sign on the coefficient of district size. In the hypothesized equation, the sign given district size was negative, while the signs were positive for per pupil direct instruction expenditures and per pupil instructional materials allocation.

In the regression analyses which were performed, district size, expenditures, and allocation all had positive signs for MATH8. Therefore, it is highly possible that the expected sign should be positive. The overall fit for equation MATH8, therefore, seems reasonable. These findings agree with those of Cardenas (1994), W. Sharp (1993), and Wainer (1993).

The estimated equation for READ4 appears to have incorrect signs. In the regression analysis, district size had a positive sign, while expenditures and allocation had negative signs. This would mean that district size had a positive effect, while increased expenditures and instructional materials allocations had negative effects on student performance for READ4. There is the possibility that the addition of a teacher's aide in the classroom at the elementary level increases costs (expenditures) without increasing student performance, as suggested by respondents to the district survey in Phase II of this study. With regard to the negative impact of an increased instructional materials

allocation not increasing student performance, the types of instructional materials purchased or the way in which the materials were purchased may influence the impact of that factor. For instance, were reading materials purchased which offered few opportunities for reinforcement and remediation? Were class sets only of instructional materials purchased so that students did not have the opportunity to take textbooks and workbooks home for additional time on task? Quality of instructional materials purchases and time on task were factors suggested by some survey respondents as influencing student performance. The negative correlation coefficients found for READ4 in Phase I would appear to support such possibilities.

In the estimated equation for READ8, the hypothesized signs for district size, per pupil direct instruction expenditures and per pupil instructional materials allocation were negative, positive, and positive, respectively. Regression analysis produced results which showed district size, expenditures and allocation all had positive signs. Thus, it would appear all of these independent variables had a positive effect on eighth grade reading scores. The overall fit for this equation, then, seems reasonable. This finding provides additional support for the questions raised by King & Ramirez (1994) regarding spending and achievement.

At the eighth grade level in the present study, increased per pupil direct instruction expenditures and per pupil instructional materials allocation had a positive effect on student achievement. However, at grade 4, increased per pupil direct instruction expenditures and per pupil instructional materials allocation did not have a positive effect on student achievement.

For all of the data analyzed in Phase I, correlations were found to exist between the dependent and independent variables. However, no significance was found at the .05 rejection level. This finding supports the work of Wise (1968), who concluded little or no significant relationship exists between expenditures and student performance. This is also true for conclusions drawn by Hanushek (1989).

Wainer (1993) has suggested that inadequate direct instruction funding leads to critical choices regarding the selection and replacement of instructional materials, and ultimately affects test scores. If choices regarding the suggested factor of quality of instructional materials purchases is considered, the findings in the present study appear to support Wainer's position.

Qualitative survey

In Phase II of the study, information was obtained from districts falling into the high five and low five districts with regard to expenditures factors. The results of that portion of the study yielded some indication that

administrators consider pupil/teacher ratio the most influential factor affecting student performance, followed by experience level of the teacher, socioeconomic/family factors, level of per pupil direct instruction expenditures, and educational level of the teacher. The least influential factor was teacher's aide in the classroom. Additional factors suggested beyond those included in the survey were time on task, test burnout, quality of direct instruction expenditures and quality of teacher attributes.

A comparison of responses from districts in the high expenditures category with responses from low expenditures districts revealed that the low expenditures district average rating for pupil/teacher ratio was 1.67 and the high expenditures district average rating was 2.0 (1.0 = the most influential factor). The low expenditures districts rated pupil/teacher ratio as being more influential than did the high expenditures districts responding to the survey.

Experience level of teacher had an average rating of 2.0 by districts in the high expenditures category and an average rating of 2.33 by districts in the low expenditures category. It can be concluded that the high expenditures districts rated experience level of the teacher as being more influential than did the low expenditures districts.

Socioeconomic/family factors received an average rating of 2.0 by the high expenditures districts and an average rating of 2.33 by the low expenditures districts. It can

be concluded that the high expenditures districts rated socioeconomic/family factors as being more influential than did the low expenditures districts.

It should be noted that the average rating for pupil/teacher ratio, experience level of the teacher, and socioeconomic/family factors all received the same average rating of 2.0 by the high expenditures districts. Experience level of teacher and socioeconomic/family factors received the same average rating of 2.33 by the low expenditures districts. It would seem from these results that more research specifically targeting these factors may clarify any differences in influence on student performance.

The average rating for level of per pupil direct instruction expenditures was 4.5 for the high expenditures districts, while the low expenditures districts rated this factor slightly higher at 4.0. It can be concluded that low expenditures districts considered per pupil direct instruction expenditures as being more influential on student performance than did the high expenditure districts. This conclusion supports the work of Cardenas (1992).

The educational level of the teacher was rated as an average of 5.5 by the high expenditures districts and as 4.67 by the low expenditures districts. It can be concluded that the low expenditures districts considered educational level of the teacher as being more influential than did the high expenditures districts.

Teacher's aide in the classroom was ranked an average influence factor of 5.0 by the high expenditures districts and an average of 6.0 for the low expenditures districts. When comparing the two factors of educational level of the teacher and teacher's aide in the classroom, the low expenditures districts rated educational level of the teacher higher than teacher's aide in the classroom (4.67 versus 6.0), while the high expenditures districts rated teacher's aide in the classroom as being more influential than educational level of the teacher (5.0 versus 5.5). This finding, along with the negative correlation found in the data analyses for grades 4 and 8 in this study, supplements the work of Drake (1994), who suggested that positive relationships between spending patterns and student outcomes could lead to manipulation of expenditures in such a way as to increase student performance on standardized achievement test scores.

Summary

In summary, for fourth grade students, both for reading and mathematics, there was a negative relationship between per pupil direct instruction expenditures, per pupil instructional materials allocation and student performance. However, there was a positive relationship between district size and test scores in both areas.

For eighth grade students, both for reading and mathematics, there was a positive relationship between district

size and student performance. However, for expenditures and allocation, there was a negative relationship for mathematics and a positive relationship for reading at the eighth grade level. One possible explanation may be that, by the eighth grade, students generally have learned to read successfully and tend to do activities independently. In the case of mathematics, by the eighth grade, increasingly more difficult, abstract concepts are introduced, perhaps requiring more interaction with peers in larger classes and, possibly, more parental involvement as well. The implication may be that parents are motivated to help students in order for them to be successful upon entering high school. Likewise, students may be motivated to meet perceived higher expectations upon advancing to the ninth grade.

Overall, for the test scores reported in this study, the fourth grade mathematics mean of the median national percentile rank scores was 55 (with 50 being the national average). For fourth grade reading, the mean of the median national percentile rank scores was 49 (with 50 being the national average).

For eighth grade student scores included in this study, the mathematics mean of the median national percentile rank scores was 51 (with 50 being the national average). In the area of reading, the mean of the median national percentile rank scores was 57 (with 50 being the national average)

When comparing across group performance of fourth grade and eighth grade students, one might expect that students would perform at a higher level, given maturity. In the present study, fourth grade students had a mean reading score of 49 and eighth grade students had a mean reading score of 57. These results would appear to support that assumption.

In the area of mathematics, however, fourth grade students had a mean score of 55 and eighth grade students had a mean score of 51. In this comparison, it may not be a question of maturity. Rather, it could be the increasing complexity and abstractness of the concepts involved with mathematics at higher grade levels.

Information obtained from Phase II of the study yielded qualitative data not available through the data obtained in Phase I. The information obtained in Phase II augmented and supplemented the outcomes of data analysis in Phase I.

Results from Phase II of the study yielded some indication that administrators consider pupil/teacher ratio the most influential factor affecting student performance, followed by experience level of the teacher, socioeconomic/family factors, level of per pupil direction instruction expenditures, and educational level of the teacher. The overall least influential factor was teacher's aide in the classroom. Additional factors suggested beyond those included in the survey were time on task, test burnout,

quality of direct instruction expenditures and quality of teacher attributes (rather than level of experience or level of education).

The data discrepancies reported by several of the districts contacted for the survey in Phase II of this study suggest there may be some spuriousness in data contained in the Profiles annual report. To be consistent throughout this study, data from the Florida Department of Education were the only data analyzed. Additionally, the types of information collected on the survey already may be reported to the Florida Department of Education for other purposes of accountability and could be captured and included in the district data reported in Profiles. This may negate the necessity of a district-level survey to obtain information.

Recommendations for Future Study

This study considered financial and student population factors which affect student performance. Size of the school district was included for purposes of this present study, but was not the specific focal point, the emphasis being on expenditures. Specific class size was not addressed here, but should be considered in other work.

Since the survey respondents indicated that pupil/teacher ratio was the most influential factor affecting student performance, research studies in this area would add to the further understanding of factors influencing

student performance. As teacher's aide in the classroom received the lowest rating, there is some basis for future research regarding this factor. With the current emphasis in the state of Florida on administrative redirect of non-instructional funds to direct instruction activities, such research could reveal information not currently available. Such information would aid legislators and educators in the state in the area of increasing student performance without increasing costs in the classroom.

The next most influential factors reported by the districts in the survey were experience of the teacher and socioeconomic/family issues. Research should be undertaken to see what influences a teacher to remain active in the profession and to explore factors fostering those influences. Socioeconomic/family factors also should be the foci of research emphasizing student performance or outcomes. High mobility of students and income levels should be investigated to see what influence they have on student performance.

Factors specifically addressing needs of low performing districts/schools were not addressed in this study. A study comparing low performing districts/schools with high performing districts/schools may disclose other influence which need to be considered, with the goal being to make all students high performers.

This present study examined data and influences for one year only. A longitudinal study of the same factors: (a) district size, (b) per pupil direct instruction expenditures, (c) per pupil instructional materials allocation, and student performance over a three-to-five-year period might yield a trend analysis showing what might occur when funding fluctuates from year-to-year. A longitudinal study might yield significance among the factors which was not found here. Also, broadening the data base to include all districts may provide more generalizable findings, conclusions, and recommendations.

The survey portion of the research was limited to 10 of the 67 Florida school districts. All 67 districts should be surveyed to gain a clearer understanding of the factors included in that portion of this study. Additionally, it is recommended that school level administrators be included in the survey. This would provide a more representative view of a particular district. Conducting such a survey as Phase I in a future study could point to other types of data which should be statistically analyzed in Phase II.

Studies related to the suggested factors of time on task and test burnout also would add to the knowledge base with regard to student performance as reflected in standardized test scores. Time on task factors should be examined from the standpoint of time on task in the classroom

and time on task outside of the classroom (i.e., homework). Cooperative learning activities, as one measure of time on task, might be included as a factor in future research.

Quality of direct instruction expenditures and quality of teachers may be difficult to undertake in subsequent studies because of the subjectivity associated with agreement on a clear definition of quality. What may be inferior expenditures to one person may be superior to another. Likewise, agreement on positive teacher qualities may be elusive due to their subjectivity. These factors may be difficult to quantify and, therefore, make it difficult to analyze relationships which may exist.

In our preparation of literate, successful citizens who will lead this nation in the first half of the next century, we must strive to gain additional insight as to how we measure that success and what factors contribute to it. Once the factors become clearer, the knowledge itself will not be enough. Strategies and plans of action will need to be developed to ensure future success.

APPENDIX

Memorandum of Transmittal

MEMORANDUM

TO: _____

_____ (COUNTY)

FROM: Marci Buchanan
3700 NE 53rd Avenue
Gainesville, FL 32609
(352) 955-6860 (Phone)/(352) 955-6872 (FAX)
EMAIL: buchanmd@sbac.edu

DATE: March 5, 1997

Thank you for your willingness to participate in this survey. The information which you provide is important to our gaining an increased understanding of what factors influence student test scores in the state of Florida.

I realize this time of the year is particularly hectic, and especially appreciate your taking the time to provide the information requested. If you have questions, please communicate with me as soon as possible and I will assist you in whatever way I can.

A target date of Wednesday, March 12, 1997, has been established for the return of the survey via fax machine. If you would still like to participate but would like additional time, please let me know.

Upon completion of the final defense of my dissertation research, in April, 1997, you will be provided with a copy of the results, conclusions and recommendations as compensation for your participation.

Data for your district were obtained from the following sources: Profiles of Florida school districts 1994-95 financial data statistical report, EIAS series 96-23 (May, 1996). Tallahassee, FL: Florida Department of Education; and L. T. Jozefczyk (1995). State and district report of norm-referenced test results, grades 4 and 8. Tallahassee, FL: Florida Department of Education.

Survey Questionnaire for Doctoral Research Study:

STUDENT PERFORMANCE AND DIRECT INSTRUCTION EXPENDITURES IN FLORIDA PUBLIC SCHOOLS

Department of Educational Leadership
University of Florida
Gainesville, Florida
1996

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Doctoral Committee Chair:
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Phone: (352) 392-2391

Doctoral Committee Co-Chair:
Dr. James L. Doud
Phone: (352) 392-2391

This research study has analyzed data from Florida public school districts which have been reported to the Florida Department of Education. These reported data were for the school year 1994-1995. Data included per pupil expenditures for direct instruction, as well as reading and mathematics test scores for fourth and eighth grade students.

Your district has been selected for inclusion in a follow-up telephone survey. Your participation is encouraged, as the information which you may provide is important to the overall purpose of this research.

Any questions you have regarding survey proceudres will be addressed prior to any research questions being asked. Should you choose to participate in this survey, you will receive a copy of the results, conclusions and recommendations as compensation for your participation. Your participation is entirely voluntary. If you choose to participate, you do not have to answer any question you do not wish to answer. You may choose to discontinue participation in this project at any time without prejudice.

(2)

A printed copy of this instrument has been forwarded to you via telephone facsimile. If you choose to participate in this survey, kindly remit a copy of this form bearing your signature via telephone facsimile at the conclusion of the telephone interview.

INFORMED CONSENT

I have read the procedure described above. I agree to participate in the procedure and I have received a copy of this description.

District:_____ _____
Signature

Date:_____ _____
Title

1. Your district's reported per pupil direct instruction expenditure for the 1994-1995 school year was $_____. Is this information correct? Yes____. No____.

   If incorrect, please provided corrected data: $_____.

2. Your district's reported fourth grade mathematics and reading achievement test scores for the spring of 1995 were:

   Mathematics:_____ Reading:_____

   Test type and form:_____

   Is this information correct? Yes____. No____.

   If incorrect, please provide corrected data for fourth grade:

   Mathematics:_____ Reading:_____

   Test type and form:_____

3. Your district's reported eighth grade mathematics and reading achievement test scores for the spring of 1995 were:

   Mathematics:_____ Reading:_____

   Test type and form:_____

   Is this information correct? Yes____. No____.

   If incorrect, please provide corrected data for eighth grade:

   Mathematics:_____ Reading:_____

   Test type and form:_____

4. In your opinion, what factors influenced your district's test scores, as referenced above, for the 1994-1995 school year? (Please prioritize your response to this question, with "1" reflecting the greatest influence and "6" reflecting the least influence.)

   A. Level of per pupil direct instruction expenditures.

   B. Pupil/teacher ratio.

   C. Teacher's aide in classroom.

   D. Educational level of teacher.

   E. Experience level of teacher.

   F. Socioeconomic/family factors.

   G. Special circumstances this year only (please specify):

   _____

   _____

(4)

Please provide other information which you believe would be of assistance regarding the factors of this study:

Thank you for taking the time to participate in this study. Your important contribution is very much appreciated.

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BIOGRAPHICAL SKETCH

Marcia Bartley Buchanan was born in Washington, D.C. In 1972, she received a Bachelor of Science degree from Auburn University. She was awarded a Master of Education degree from the University of Florida in 1981.

Classroom teaching experiences have included federal entitlements programs, as well as community college, middle school and high school courses, both in the public and private sectors. A veteran of the United States Army, Marcia has worked for the School Board of Alachua County, Florida, for 12 years.

Leadership roles in Florida have included serving as President of the Florida Association of District Instructional Materials Administrators and President of the Florida Association of Instructional Supervisors and Administrators. She has also served on the Board of Directors of the Florida Association of School Administrators.

Marcia is the daughter of the late William Reedy Bartley, III, and the late Betty Rosalind Burke. She comes from a large family of siblings: brothers Bill (deceased), George, and Dell; and sisters Dawn, Enid, Nina, Regina, and Sandra. She has one daughter, Kimberleigh Jane Buchanan.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Education.

David S. Honeyman, Chair
Professor of Educational Leadership

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Education.

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This dissertation was submitted to the Graduate Faculty of the College of Education and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Education.

August, 1997

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